Contractors and Engineers

JANUARY 1953

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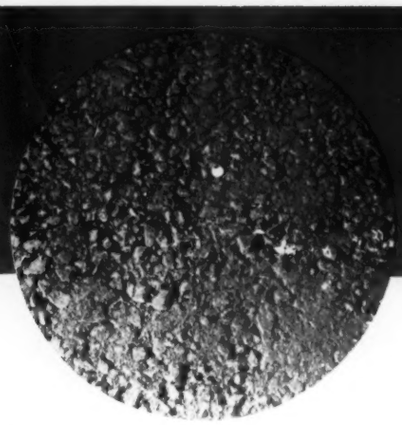
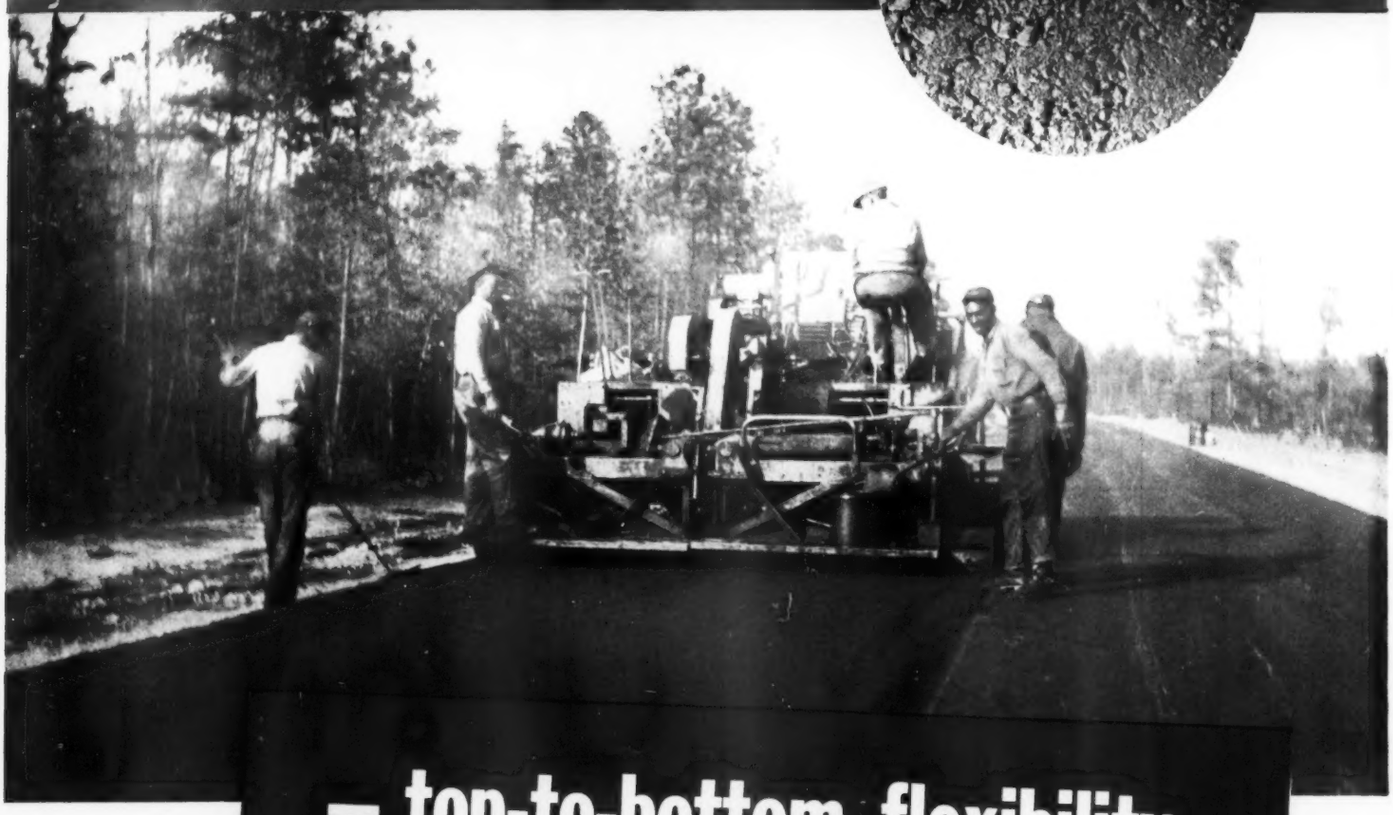
SCIENCE

Specially-built gantry moves slowly down steep Colorado mountainside, carrying a 60-foot 39-ton section of 96-inch-diameter steel penstock for a hydro-electric-irrigation project.

Story on page 6.

A Virginia highway's answer to modern, heavy traffic—





—top-to-bottom flexibility

Large photo shows the Texaco Sand Asphalt wearing surface being laid on Virginia Route 147 near Richmond. Other photo is a close-up of the Texaco Asphaltic Concrete foundation. The Atlantic Bitulithic Company of Richmond did the work.

Virginia's Route 147 is a primary highway, used by traffic on US-1 and US-60 to by-pass the city of Richmond. A section of this route now under construction is noteworthy because of one feature, in particular. From surface to subgrade, it is 100 percent flexible in character. A 1½ inch Texaco Sand Asphalt wearing surface is being laid on a 5-inch Texaco Asphaltic Concrete foundation, under which there is a 6-inch sub-base of clay-gravel.

Completely flexible construction, such as that employed on this Virginia highway, possesses advantages which pay off in durability and low maintenance cost. A highway of this type absorbs the impact of heaviest traffic, greatly reducing the possibility of damage due to this cause. Because it is flexible for its full depth, the highway structure maintains complete contact with the supporting subgrade. Unevenness in the surface due to settlement of the subgrade can be corrected quickly and at low cost, with a minimum of inconvenience to traffic.

Road builders have solved their highway and street construction problems successfully with the aid of Texaco Asphalt products for almost half a century. Texaco Asphalt Cements, Cutback Asphalts and Slow-Curing Asphaltic Oils include products for every purpose, from heavy-duty paving to dust-laying. Two helpful booklets which discuss all of these types can be obtained by road builders without cost or obligation by writing our nearest office.

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NEWS AND VIEWS

of the Construction Industry — C & E's 1953 Forecast

Our crystal ball broke the other day, so we cannot attempt to offer any definitive statements as to what to expect in 1953 with regard to such things as the new Administration, the threat of war, controls and regulations, or whether the problem of **adequate highways** will be solved. The situation, as always, calls for vigilance.

On our ever-present highway crisis, **President-Elect Eisenhower** has declared that "A solution can and will be found through the joint planning of the Federal, state, and local governments. In this, the national Government can supply leadership to band all units of government in an efficient and honest attempt to build America into the great and prosperous nation it can become."

To determine just how much of this crisis would be relieved in 1953, CONTRACTORS AND ENGINEERS made a **survey of all state highway departments.** Although many of the answers to our questions were necessarily based only on estimates, we were able to combine the information with other data to develop some picture of this year's program. We estimate that the nation will spend about **$150 million more on roads in 1953 than in 1952.** This means an increase of about 5 per cent, or a total expenditure of about $3 billion.

The expected rise is not as great as was that of 1952 over the previous year, but it should be pointed out that 1952 represents the all-time high in highway construction volume. In addition, costs have now begun to level off. Increases in appropriations, therefore, will be used to lay pavement instead of merely absorbing higher prices.

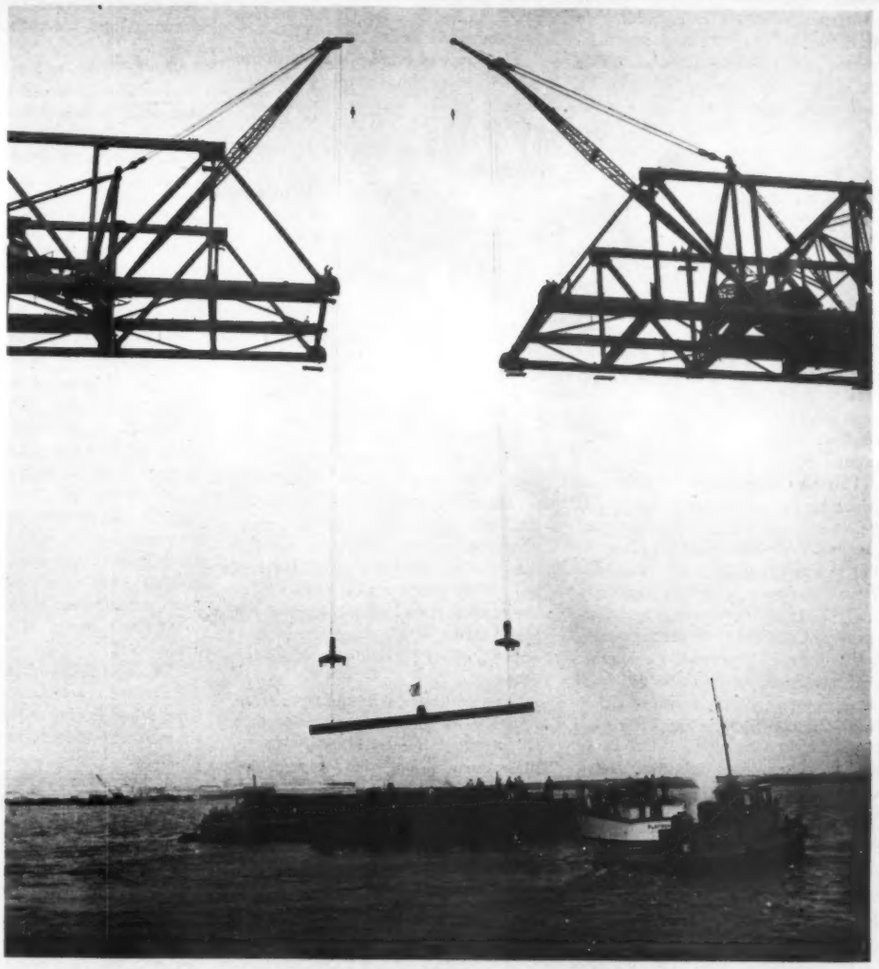
Concerning pavement, the new construction funds will probably be spent on about 1,700 miles of concrete, 35,000 miles of bituminous and treated types, and 16,000 miles of other types of roads.

Although our survey showed a probable increase of less than 5 per cent on state work, we believe that the road-building activity of other groups will make up the difference. The Government has allotted **$575 million for 1953 Federal Aid,** an increase of 15 per cent over last year. Counties and municipalities can be expected to use as much of this sum as they can get.

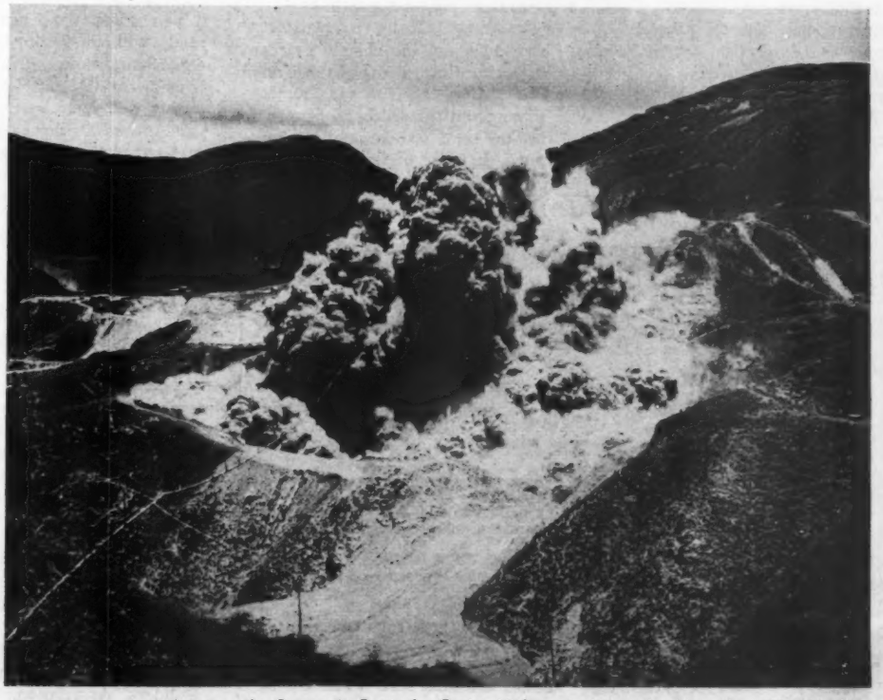
Toll roads, which are usually operated outside of state highway departments, are in one or more stages of development in over 30 states. Also, with controls relaxing on building construction, associated road and parking-area work should probably increase.

The public's recognition of the tremendous need for highways will also do much to assure continued activity. Voters in many states gave **decided approval to various highway proposals** on last November 4. In fact, about $430 million worth of road and street referendums were adopted. Election day also saw the passage of a number of anti-diversion amendments. This brings to 24 the number of states which have acted to protect highway funds by constitutional amendment.

At any rate, the 1953 outlook for the construction industry is very bright.



Bethlehem Steel traveler cranes hoist this 16-ton chord member to close the gap on the new John E. Mathews Bridge which spans the St. John's River at Jacksonville, Florida.



Big blast opens a rock cut on the Caracas to Puesto La Guaira Highway in Venezuela. More than 390,000 cubic yards were loosened by the 220 tons of dynamite.

EDITORIAL

The Year Ahead

From every point of view, 1953 should be another good year for the construction industry. According to U. S. Department of Commerce estimates, an all-time high of $33⅓ billion may be reached this year on new construction—an increase of about $1 billion over last year. This general optimistic forecast bears out C. & E.'s own survey of all state highway departments taken at the close of last year. Its findings are outlined on our News and Views page. According to this forecast, highway expenditures will come close to $3 billion, to set a new record for road building.

Increased activity is also expected in commercial building, public utilities, and defense construction, with perhaps a tapering off of private industrial building as some defense-plant projects near completion.

This continued postwar upswing in spending for construction should not be considered part of a boom-bust cycle of the whole economy, according to the Committee for Economic Development—a nonprofit organization of leading businessmen and educators, engaged in nonpartisan consideration of national economic policies. A comprehensive research study issued recently by the CED in book form—"Stabilizing Construction: the Record and Potential" by Miles Colean and Robinson Newcomb (McGraw-Hill Book Co.)—challenges the general belief that the construction industry is subject to 18 to 20-year cycles of depression-precipitating declines. Or that serious postwar declines are inevitable.

The study also takes issue with the popular theory that public works can offset drastic declines, and that violent swings in construction activity set in motion broader economic fluctuations.

From a thorough analysis of the construction industry, the authors find nothing to support a cyclical interpretation with regard to building activity. They likewise see no postwar threat of collapse in the foreseeable future such as occured in 1932, and feel that construction volume can remain at a high level with public and private development of sound economic policies.

Rather than having to resort to public works as a pump primer, the study suggests greater long-term planning, budgeting, and coordination of Federal, state, and local programs. According to the findings, the construction industry fluctuates less than some other major segments of the economy, and falling demand for some forms of construction is frequently offset by rising demands for others.

In the authors' opinion, restrictive practices by employers, workers, and Government usually not only fail in their purpose but also prevent the industry's growth to its proper potential.

A Foot Is a Link Is 0.3048 Meter

It is easy to lose sight of the fact that 5½ yards still make 1 rod, pole, or perch and that 40 of these units make 1 furlong. Ten chains make a furlong too, if they are Gunter's or surveyor's chains (66 feet), not engineer's chains (100 feet, or links). Archaic? Why yes, but no more so than inches and feet, pounds and tons—standards in everyday use in the English-speaking world. Pretty well everyone else gave up about 150 years ago and adopted the metric system.

These reflections are called forth by a recent appeal for standardization made at a meeting of the American Standards Association by William L. Batt, retiring U. S. Minister for Economic Affairs to the United Kingdom. Mr. Batt's objective is nothing so radical as a revision of world weights and measures. All he wants to do at the moment is to straighten out the chaotic practices in the drafting rooms of the United States, Great Britain, and Canada—three countries which do happen to use the same standards of measurement. In spite of this, the need to redraw American, British, and Canadian blueprints to fit the shop practices of the individual countries is causing costly production delays in our program for the exchange of equipment. Get top management men in each country to realize the importance of international negotiation on this subject, says Mr. Batt, and standardization of engineering drawings and blueprints will follow easily.

We heartily endorse Mr. Batt's views. Dare we go further and suggest that in our picturesque world of medieval weights and measures it is "time for a change"?

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Better Highway Awards

The winners of the General Motors Better Highway Awards will well deserve the handsome prizes offered if they come up with some satisfactory answers in their essays on "How to Plan and Pay for the Safe and Adequate Highways We Need." It is not an easy subject, for the solution to America's highway problem has so far eluded the grasp of the professionals in the field—the Government officials at all levels who are responsible for the country's highway systems. For according to the U. S. Bureau of Public Roads, about 200,000 miles of our principal highways are substandard in construction for today's heavy and fast-moving traffic.

Since the highway administrators for diverse reasons, mostly financial, have failed to give the motoring public safe and adequate roads, here is a chance for the amateurs to put their theories forward for consideration. This essay contest should stimulate fresh thinking on the subject, and some revolutionary ideas from the average motorist may turn out to be very worthwhile. Contestants will probably find it a lot easier to write about planning than paying for these highways. Getting the necessary funds involves taxation, of course, in one form or another, and taxation is never popular.

If some bright thinker can set forth a plan whereby we can have more roads without getting deeper into debt than we are, the $194,000 in cash prizes GM is offering will be money well spent. After all, we do have to find a place to put all these cars that the manufacturers are turning out year after year.

Particulars of the contest appear on page 78.

ARBA Promotional Brochure

"The Road to Reality" is an ARBA brochure, used in the organization's membership campaign last fall. The booklet discusses the history and objectives of the ARBA, and how the organization serves the public. The oldest national organization dedicated to better roads, the ARBA was founded in 1902, when paved streets ended at the city limits. It has for a half a century insisted on better and safer highways and streets to accommodate the improved design and the increased numbers of motor vehicles which are added to our highways each year.

Copies of this brochure may be obtained from the American Road Builders' Association, International Bldg., Washington 4, D. C.

Covering the Field

- **Penstock**
  A special steel straddle-type gantry sets penstock sections for a Colorado hydroelectric project. Story and pix are on page 6.

- **Building Construction**
  Steel beams replace rotted pile sections, save a building. Page 13.
  Sand makes a good foundation when specially compacted. See how, page 17.
  The AEC builds a steel sphere to house a submarine reactor for the Navy. Read the story on page 66.
  And the Navy adopts tilt-up construction for a plant. Page 92.
  A $100,000,000 contract for a G-E plant expansion. Story on page 97.

- **Air Base**
  An extended runway for Moody Air Force Base has a lime-rock base course topped with plant-mix. Story, page 19.

- **Dam**
  A huge clay-core dam changes geography to provide power for an aluminum smelter in Canada. Turn to page 24 for story and pix.

- **Highways**
  New Jersey's Parkway gets a concrete 4-lane extension. Story, pix, page 40.
  Danger to motorists from falling rock is averted by covering the slopes with wire mesh. Page 48.
  Man-made snowslides bring snow down before it hurts anyone. Page 64.
  Asphaltic concrete—3 layers for U.S. 77 in Oklahoma. Page 69.
  Grading in granite, clay, sand, and gravel poses a problem. Story, page 83.
  Highlight of the AASHO Annual Meeting was a plea for speedier road building. Report, page 102.
  Hot-mix patching speeds repair work, replaces cold-patching. Page 114.

- **Bridges**
  Without traffic interruption a bridge is refloored with open-mesh steel decking. Story on page 11.
  Reinforced-concrete piers and abutments are built for two ballast-deck bridges on a railroad-relocation job. Description of the work on page 53.

- **Personalities**
  A young engineer crosses the country by trailer. Read his story, page 32.
  Meet Verne Watson, the hole digger from Texas. Page 72 will introduce you.

- **Industrial**
  A water-intake structure for an oil company is built on the Mulberry Harbor plan and floated into place down river. Story and pix, page 94.

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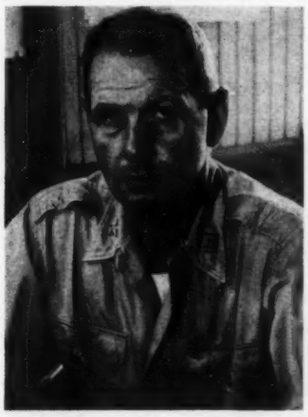
Sturgis Heads Army Corps of Engineers

Maj. Gen. Samuel D. Sturgis, Jr., has been appointed Chief of the U. S. Army Corps of Engineers. Currently Commanding General of the Communications Zone of the U. S. Army in Europe, he succeeds Lt. Gen. Lewis A. Pick, who retired last November.



Maj. Gen. Sturgis, Jr. *U. S. Army Photo*

Following in his father's and grandfather's footsteps, Gen. Sturgis was graduated from the U. S. Military Academy. Then followed a period of further training and assignments, including 4 years as instructor at the Academy. In 1926 he was stationed in the Philippines, where he obtained knowledge which proved invaluable to him 18 years later on his return, as Chief Engineer of the Sixth Army, for the reconquest of those islands. In those early days he participated in the mapping of Luzon and initiated work on the defenses of Bataan. In the interim, before the war, came more training and assignments. While in the Engineer and training unit for the Cavalry School at Fort Riley, Kans., he became aware of the need for modern engineer mechanical equipment to keep abreast of mechanized warfare. He applied for and received the first of such equipment made available to an Engineer troop unit of the Army. This was the pilot test which resulted in the subsequent provision of the bulldozer, the diesel shovel, the air compressor, and other modern construction machinery for our Engineer troops in World War II.

In 1942 Gen. Sturgis became Chief Engineer of the Sixth Army and proceeded to Australia where he remained for over 3 years. During this time, he was in charge of all airbase, port, and Army construction in 22 amphibious operations from Australia to Japan. He participated in the New Guinea, New Britain, and Admiralty Islands campaigns; the invasion of Leyte; the conquest of Luzon; and the occupation of the Japanese islands. In this period he was awarded the Silver Star, the Legion of Merit, the Bronze Star Medal, and the Distinguished Service Medal for his outstanding work.

His war service was followed by an appointment as Air Engineer at Air Force headquarters, an assignment to the Operations Training Division, War Department General Staff for staff duty, and the assignment as Engineer of the Missouri River Division, stationed in Omaha, Nebr. A year later he was transferred to the European Command, and in March, 1952, became Commander of the Communications Zone of that Command.

Though his appointment as Chief of the Army Engineers was effective December 1, his European assignment will detain him for some time. In the interim, Maj. Gen. George J. Nold, Deputy Chief of Engineers, is Acting Chief.

ASTM Publishes Symposium On Acoustical Materials

Noise is one of the worst trials of our modern civilization, and noise abatement one of its most important problems. The American Society for Testing Materials, believing that the proper use of acoustical materials is the best way to reduce noise, recently organized Committee C-20 on Acoustical Materials. This Committee, together with five technical subcommittees, has been studying the properties of those materials used to absorb air-borne sound and stimulating research and development of tests, specifications, and definitions of terms. The ASTM has now brought out a 40-page book entitled "Symposium on Acoustical Materials", which discusses briefly the origin and history of Committee C-20 and outlines the various problems it is attempting to solve.

The book opens with an introduction by H. A. Leedy, Director, Armour Research Foundation, Illinois Institute of Technology, who is the Chairman of Committee C-20. This is followed by a brief history of the acoustical-materials industry by Wallace Waterfall. The rest of the book is taken up by committee members' discussions on: the measurement of sound absorption; combustibility of acoustical materials; the erection of acoustical tile; and basic physical properties of acoustical materials.

"Symposium on Acoustical Materials" is bound in a heavy paper cover and priced at $1.00 a copy. It may be obtained from the American Society for Testing Materials, 1916 Race St., Philadelphia, Pa.

Prestressed-Concrete Course

A series of eight lectures and discussions on prestressed concrete is being co-sponsored by Newark College of Engineering and the Portland Cement Association. The lectures will be open to engineers, architects, manufacturers, and contractors and will be held on consecutive Monday and Thursday evenings from April 6 to 30 at the college.

For additional information write to the Special Courses Division, Newark College of Engineering, 367 High St., Newark 2, N. J.

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The Pole Hill penstock layout showing the rails and gantry, with the bridle leading up to the hoist. Crane at left handles sections for gantry.

Special Straddle-Type

Gantry Sets Penstock

On Steep Mountainside

By RAY DAY

(*Photo on page 1*)

Welder applies Smithway rod to field-weld the few joints which had to be made up on the steep hill. Far below the power plant is under construction.

• IN Colorado's rugged mountain country southeast of Estes Park, U. S. Bureau of Reclamation engineers plan to drop Colorado-Big Thompson water from Pole Hill Tunnel down an 831-foot mountainside. Southwest Welding & Mfg. Co. of Alhambra, Calif., is wrestling with one of the most difficult problems in the gigantic hydroelectric-irrigation project. Its contract calls for Southwest Welding to build Pole Hill (at $820,966) and Flatiron (at $3,463,516.50) power penstocks complete. The handling of heavy steel pieces weighing up to 39 tons on mountain slopes as steep as 63 per cent is the principal headache.

It is a job calling for special equipment, lots of figuring, and extreme care . . . to say nothing of field fitting and welding under difficult conditions. Already one special gantry has plunged down the mountainside and dashed itself to pieces when the hoist failed at the top of the Pole Hill penstock. The

job is spectacular in the extreme.

Pole Hill is a single penstock, 96 inches in diameter, with a power drop of 831 feet in its laid length of 2,100 feet. The big steel pipe has walls up to 1⅝ inches thick, and will work under pressures approximately 380 pounds per square inch where the line enters the Pole Hill powerhouse at the foot of the drop.

Flatiron is a twin penstock, consisting of a pair of steel tubes tapering from 84 to 78 to 72 inches in diameter. This penstock will have a power drop of 1,059 feet in its laid length of 5,789 feet, making the grade considerably easier than the spectacular drop at Pole Hill. The Flatiron penstock will have maximum working pressures up to 450 pounds per square inch.

By comparison with other high power drops in the United States, these are impressive in their own right. The highest power drops in the United States are on the Pacific Gas & Electric Co.'s Feather River system in northern California. Bucks Creek and Balch power drops—a part of that system—both exceed 2,000 feet.

Special Equipment at Pole Hill

The installation job at Pole Hill penstock was so difficult that Southwest Welding called in Winston Bros. Co. of Monrovia, Calif., to blast a pathway down the steep mountainside and lay a special rail-

The loaded gantry makes a steep descent carrying a penstock pipe section.

road with rails 15 feet apart. Southwest Welding's engineers, under Chief Engineer S. R. Lanier, then designed the interesting special gantry—it reminds you of a lumber carrier—which is carrying and spotting the heavy 60-foot penstock sections in position. Winston's subcontract also called for the construction of reinforced-concrete anchors to support the pipe. There are 8 such anchors at Pole Hill; 16 at Flatiron.

Bureau of Reclamation specifications permitted the low bidder to manufacture and place the penstocks with considerable latitude. A-285 steel, A-212 steel, and Dresser-type coupled penstock were permitted. In the case of A-212 steel, the USBR demands that it be fully stress-relieved.

With this kind of latitude, Southwest Welding & Mfg. Co. decided to use A-285 steel for the upper part of the Pole Hill penstock. When working pressures caused the steel walls to increase to about 1⅛ inches in thickness, where field welding was too extensive to be economical, a design of A-212 pipe was used, carrying on down to 1⅝-inch walls. Since A-212 cannot be adequately stress-relieved in the field, a system of rivets was designed for these joints. The last 10 per cent of the line near the powerhouse will be covered with backfill, and a Dresser-coupled design was chosen there. The entire line will have to be leakproof at 150 per cent of its designed pressure.

The penstock is being anchored tight at the anchor blocks by making a monolithic-concrete pour, embedding the pipe in the concrete. Approximately midway between anchor blocks is an intricate highly machined stainless-steel expansion joint. Small pedestals of concrete with steel rocker supports will permit the penstock to make any expansion or contraction movement between the anchors.

Manufactured in California

The Pole Hill penstock is being manufactured 100 per cent at Southwest Welding & Mfg. Co.'s Alhambra, Calif., plant, and the Flatiron penstock is being manufactured both at Alhambra and the company's Richmond, Calif., plant. A Unionmelt automatic welding procedure is being used to join the many seams necessary to fabricate the penstock. After being shipped by rail to an unloading point 9 miles from the job, the penstock sections are transferred to heavy specially designed pipe-carrying trailers and hauled out to the top of the Pole Hill drop. A 40-ton American crawler crane at that point moves the sections over to where the special gantry can pick them up.

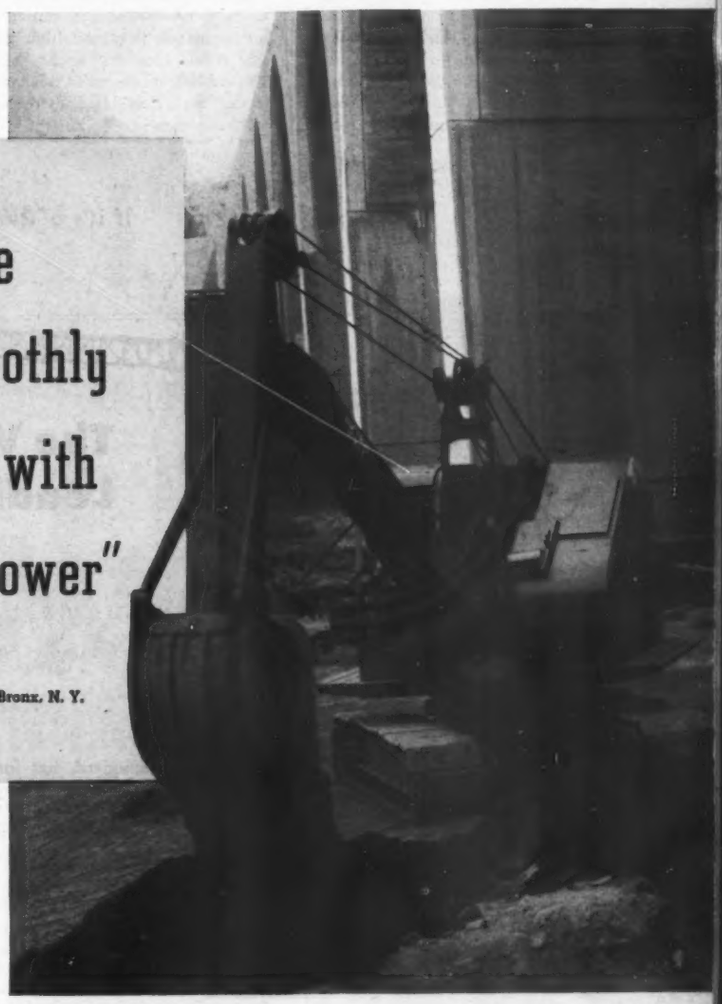
Foundations Previously Placed

The heavy reinforced-concrete foundations and anchor blocks were constructed by Winston ahead of present work. As early as the winter of 1951, Winston's crews were busy with compressors, jackhammers, and powder, shaping up the steep grade

(Continued on next page)

"This machine operates smoothly and fast with CAT D318 power"

J. McKINLEY, Foreman
Civetta Excavating, Inc., Bronx, N. Y.



This Bucyrus-Erie back-hoe with ¾-yard bucket is excavating for a storm sewer on a two-lane highway joining the new Bronx River Parkway extension. The section you see here had to be cleared quickly, as machine and trench blocked access for trucks loading spoil. They weren't held up long. The section was cleared on the double. J. McKinley, Foreman for Civetta, sums up the reason in ten words: "This machine operates smoothly and fast with Cat D318 power."

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Gantry Sets Penstock On Steep Mountainside

(Continued from preceding page)

for the Pole Hill penstock. As the rock was blasted loose, a D8 Cat with a dozer blade worked on the slope to shove the loose material ahead. A service road intersected the grade at two points, permitting excess material to be loaded out. The heavy timber ties for the railroad track were carefully bedded on backfill earth placed over solid rock, and the anchor foundations were carried well down into solid rock.

Forming for the anchors was conventional, with wood panels prefabbed in Winston's yard and trucked out to the site. The big blocks—some contained up to 50 cubic yards of concrete—were hard to get to, however, so some ingenuity had to be used. Truck mixers delivered concrete from Winston's Conveyco batch plant to a few of the anchors, but for the most inaccessible blocks, a delivery line had to be laid from the top of the mountain and the concrete had to be pushed to its point of placement by a Kemper pressure pot, ordinarily used in tunnel-lining work.

Special Gantry Placement

The special gantry for installing the penstock sections is a structural-steel affair built like a lumber carrier, with about 14 feet of vertical clearance under the pipe and 15 feet of sidewise clearance. The rig is mounted on trucks of two double-flanged wheels each, one truck being at each corner of the gantry. A heavy tongue is placed high up, so that it will clear the anchor blocks. The cable from the main hoist at the top of the grade leads to a sheave on this tongue.

The hoisting apparatus on the gantry consists of a Racine hydraulic pump driven by a Wisconsin engine. This pump delivers about 1,000 pounds pressure to hydraulic rams on each corner of the rig. These hydraulic pistons are 10 inches in diameter and can be independently controlled, making it possible to place a penstock section to very close tolerance. By picking up the section with a flexible sling and a rolling hitch, the pipe can even be rolled in the air. The gantry was fabricated in six main sections, shipped to the job, and assembled there. The one currently in use at Pole Hill penstock is a refinement of an earlier model which got away when a hoist failed and wound up at the foot of the mountain, utterly ruined.

The penstock is being erected by placing the anchored pieces first and then building outward from both sides toward the expansion joint. The gantry lands the "tight" sections on structural supports embedded in the base of the anchor blocks. These supports can later be welded to the pipe after it has been located and checked. Small 50-ton Buda jacks are on hand for this purpose; however, the sections can be landed by the gantry to very close tolerances.

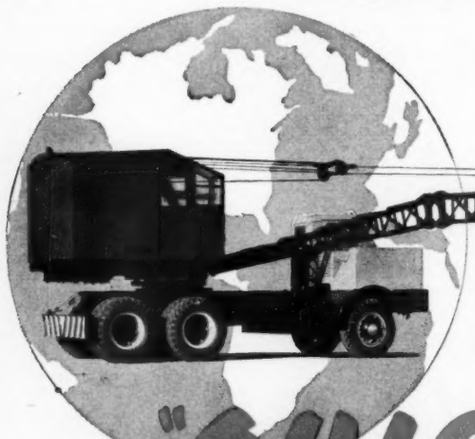
The sections are picked up at the top of the grade by the special rig and are slacked slowly down the mountain as cable is paid off from the hoist drum. A telephone system connects the hoisting engineer with the signalman on the gantry.

After the sections are in place, aligned, checked, and a fit-up ring is in place, welders move in to make the field joints. There are 7 Lincoln gasoline-powered 300-amp arc welders on the project; 5/16 and 5/32 rod is being used. The number of passes depends entirely on the increasing thickness of the penstock walls, and in most respects field welding is an ordinary boiler-making job. The penstock sections are beveled at the time of manufacture for the field weld, and are so arranged that the welding can be done inside the line. All welders are certified men, and field welding techniques approximate those of the certification tests as much as possible.

Field welds, as well as those in the fabricating shop, are thoroughly X-rayed. According to Gil Yetter, Mechanical Inspector of the USBR, the X-ray tests are usually as accurate an index to watertightness as the actual load tests. Whatever leaks may develop in the big Pole Hill penstock will very likely show up in the riveted, rather than the welded, sections.

After the penstock is finished and tested for watertightness, its inside will be sandblasted and given a coat of hot coal-tar enamel. The outside will also be sandblasted and coated with aluminum paint. This work has been let under a subcontract to O'Connor Rustproofing, Inc.

Work is under way on both powerhouses, which are expected to be finished by the time the penstocks are complete. Water passing down the east slope of the Colorado-Big Thompson system originates in the Colorado River west of the Continental Divide and is sent through



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"QUICK-WAY" Model S Shovel

"QUICK-WAY" Model E Trench Hoe

"QUICK-WAY" the original Truck Shovel and always the standard, has for 30 years demonstrated its versatility and adaptability as well as its superb engineering and long lasting construction, not only in the United States but in 65 foreign countries as well.

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You can mount basic unit on your own truck or purchase complete with your choice of trucks.

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Model E 7½ Ton Crane, 4/10 Cu. Yd. Capacity, 5 to 7½ Ton Truck
Model S 5 Ton Crane, ½ Cu. Yd. Capacity, 2 to 3½ Ton Truck
Model J 3 Ton Crane, ¼ Cu. Yd. Capacity, 1½ to 2½ Ton Truck

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QUINN WIRE & IRON WORKS 1645 17th BOONE, IA

the Adams tunnel under the Rockies. It will be milked of its hydroelectric potential as it drops down thousands of feet on the east slope toward the agricultural land it is designed to irrigate.

When the Big Thompson project is complete, engineers will likely say for many years to come that the installation of these big penstocks on mountain grades of 45, 58, and 63 per cent was one of the most difficult construction feats in the entire project.

Personnel

The Southwest Welding & Mfg. Co.'s field operations are being directed by Resident Field Engineer A. H. Zimmerman. Robert Edens is Project Engineer in charge of all phases of shop fabrication and penstock design.

USBR work is under the general supervision of Chief Engineer L. N. McClellan. The Pole Hill penstock is under Construction Engineer Frank Matejka, with Pete Otterson as Resident Engineer. Flatiron is under Construction Engineer G. R. Highley, with Howard Smith as Resident Engineer.

Overseas Jobs for Civilians

The Army Corps of Engineers urgently needs qualified employees for its current world-wide construction program. The progress on vital construction work outside the United States is being hampered by an acute shortage of engineers and tradesmen. This need will continue because of the necessity for replacing those who have already served extended periods overseas.

Positions to be filled include: all types of engineers; engineering aids; engineering draftsmen; architects; geologists; soil mechanics; supply catalogers; organization and methods examiners; fiscal and cost accountants; contract specialists; administrative assistants; investigators; boiler, petroleum, oil, and lubricant inspectors; power - plant - operator foremen; maintenance superintendents; steam - operating - engineer foremen; and engineering-equipment shop superintendents. The positions are in Alaska, Austria, French Morocco, Germany, Iceland, Japan, Libya, Okinawa, Puerto Rico, Saudi Arabia, and Turkey. Every effort has been employed to provide comfortable living conditions at reasonable cost, and most of the jobs carry increased pay for overseas locations. Transportation to and from the distant points is furnished at government expense to those who fulfill the employment agreement.

Further information may be obtained by writing to 548 Boatmen's Bank Bldg., 420 Locust St., St. Louis 2, Mo. The Corps feels that those who apply will not only serve their country patriotically, but will also gain in work experience and general knowledge afforded by travel to foreign lands.

Concrete-Joint Sealing

A revised data sheet describing Flintseal rubber-asphalt hot-poured joint-sealing compound for concrete pavements has been issued by The Flintkote Co., 30 Rockefeller Plaza, New York 20, N. Y. Illustrations show the latest specialized equipment used for melting and pouring the compound and also methods and machines used in cleaning and preparing joints for sealing.

This literature may be obtained from the company by requesting Data Sheet No. 1-H 601, or by using the Request Card at page 18. Circle No. 270.

MIXERMOBILE DISTRIBUTORS

ALA.—Construction Equipment Co., 2921-2 Avenue, S., Birmingham; Mobile Elevator & Equipment Co., Inc., 100 North Water St., Mobile 3.
ARIZ.—Equipment Sales Co., 720 So., 19th St., Phoenix.
ARK.—Choctaw, Inc., P. O. Box 1300 1300 Bond St., Little Rock.
CALIF.—Bronson Equipment Co., 1310 N. Rosemead Blvd., El Monte; Mixermobile Co., Inc., 2451½ South Western Ave., Los Angeles 4; Mixermobile Sales & Service, 53 - 23rd Avenue, Oakland 4; Growers Trac. & Imp., Inc., 1300 "U" Street, Sacramento 7; Tulare City Tractor Co., Visalia.
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CONN.—Hedge & Mattheis Co., 391 Prospect Street, East Hartford; Hedge & Mattheis Co., 70 Orange Street, West Haven.
FLA.—Neff-Thomas Mach. Co., 1920 N. W. Miami Court, Miami 36.
GA.—Tractor & Mach. Co., 470 Glenn St., S. W., Atlanta.
IDAHO—Western Equipment Co., 4000 Fairview, P.O. Box 1450, Boise; Western Equipment Co., P.O. Box 96, Idaho Falls.
ILL.—Arrow Contractors Equip., 2020 West Walnut St., Chicago 12.
IOWA—Heiner-Harker Co., 1810-16th Ave., S. W., Cedar Rapids; Anderson Equipment Co., 306 S. Virginia St., Sioux City.
KANS.—Victor L. Phillips Co., 3611 N. Broadway, Wichita.
LA.—Southern States Equip. Co., 425 Celeste Street, New Orleans 11.
MAINE—Hedge & Mattheis Co., P.O. Box 120, Bangor; Hedge & Mattheis Co., 105 Preble St., Portland; Hedge & Mattheis Co., Outer State Street, Veazie.
MASS.—Hedge & Mattheis Co., 754 Southbridge St., Auburn; Hedge & Mattheis Co., 285 Dorchester Ave., Boston 27; Hedge & Mattheis Co., 83 Spring Street, West Springfield.
MICH.—Contractors Machinery Co., 333 Midland Avenue, Detroit 3; Contractors Machinery Co., 530 Monroe Ave., Grand Rapids 2.
MINN.—Minneapolis Equipment Co., 520 Second St., S. E., Minneapolis.
MISS.—Choctaw, Inc., Hwy. 80 W. & Gallatin, Jackson.
MO.—Victor L. Phillips Co. 1000 Baltimore St., Kansas City 8; O. B. Avery Co., 1325 Macklind Ave., St. Louis 10.
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NEBR.—Anderson Equipment Co., Inc., 616 Merchants Nat'l Bank Bldg., Omaha.
NEV.—H. Waldman Motor Equipment Co., 1715 E. Fremont St., Las Vegas; Mack Truck Sales, P. O. Box 1813, Reno.
N. H.—Hedge & Mattheis, 80 S. Main St., Concord.
N. J.—E. H. Klienbonstein Co., 1099 Hendricks Causeway, Ridgefield.
N. MEX.—Lively Equipment Co., 2601 N. 4th., P.O. 784, Albuquerque.
N. Y.—Slade Tractor Co., 924 Broadway St., Albany 4; Rupp Equipment Co., 101 Great Arrow Avenue, Buffalo 16; Hodge & Hammond, Inc., 720 Garrison Avenue, New York 59; Credle Equipment, Inc., P.O. Box 110, Potsdam; Rupp Equipment Co., 1011 Buffalo Road, Rochester; Credle Equipment, Inc., 309 N. Genesee Street, Utica 4.
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TEXAS—J. W. Bartholow Machy. Co., 1221 South Lamar Street, Dallas 2; Lively Equipment Co., 1423 E. Missouri, P.O. Box 1436, El Paso; South Texas Equipment Co., Inc., 5500 Navigation Blvd., Houston 1; Conley-Lott-Nichols Co., 3601 Avenue "H", Lubbock; Contractors Machy. Co., 302 Dora St., P.O. Box 8057, San Antonio 1.
UTAH—Heiner Equip. & Supply, 501 West 7th South St., Salt Lake City.
VT.—Hedge & Mattheis Co., Bridge Street, Bellows Falls; Hedge & Mattheis Co., 285 South Main Street, Rutland.
VA.—M. R. Hamill, Inc., 1824 Pennsylvania, P.O. Box 907, Charleston 23; Capitol Equipment Co. Inc., 2050 Westmoreland Avenue, Richmond; Semiss Equipment Corp., 1531 Shenandoah N., Roanoke.
WASH.—Air-Mach, Inc., 614 Elliott Ave. W., Seattle 99; Yukon Equipment Co., Coleman Bldg., Seattle 4; Western Equipment Co. 2322 Olive, Box 2188, Spokane.
WISC.—Hunter Trac. & Mach. Co., 327 South 16th, Milwaukee 3.
CANADA—W. A. R. McGrew, Ltd., P.O. Box 335, 6 McDougall Court 10062-100 St., Edmonton, Alberta; Contractors Mach. & Equip., Ltd., 194 Barton Street East, Hamilton, Ontario; Dietrich-Collins Equipment Co., 890 S. W. Marine Drive, Vancouver, B. C.; Automotive Products Co., Ltd., 3282 Wellington Street, Montreal, Quebec; Modern Machinery, Ltd., 120-4th St., West, Quebec City, Quebec.
EXPORTERS—Columbia Exporters, Inc., 1165 S. E. Morrison St., Portland; North Pacific Corp., 1809 N. E. 40th Ave., Portland.

"HANDS of STEEL"

by MIXERMOBILE MANUFACTURERS

a powerful "Four-Act" play

featuring THESE "WORK-TESTED" STARS!

DOZERMOBILE (Model DM-1) A powerful four-wheel drive dozer and tractor with unique flexible steering hinge. The operator's finger-tip controls virtually give him "Hands of Steel" as hydraulic cylinders direct steering and dozer blade movements. Here is a top performer in "Heavy" roles wherever power, flexibility, and work requirements are rugged.

DUO-WAY SCOOP (Model DS3H) A performer with a dual personality. This machine has a dozer blade at one end and a 1½ cubic yard scoop bucket at the other end. Positive hydraulic controls, ease of operation and power to handle most any scooping and dozing problem rates the Duo-Way an "Oscar" for year 'round results.

SCOOPMOBILE (Model "H") A versatile, fully hydraulic front-end loader, this machine plays the lead in countless roles of shoveling, loading, and transporting all types of bulk materials. Powerful planetary drive plus amazing boom and bucket stability give tough trouble-free service. Critics are quick to give the Scoopmobile—Model "H" the best reviews.

SCOOPMOBILE (Model "C") A veteran of many curtain calls is this rugged materials handler. The Model "C" with its wide variety of easily changed attachments is starring as a "Quick-change" artist on many production stages all over the world. With track extensions, the Model "C" is particularly adapted to high lifts.

All units standard equipped with planetary drive.

MIXERMOBILE DISTRIBUTORS, INC.

8027 N. E. KILLINGSWORTH ST.
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PORTLAND 20, OREGON

Higher Power Output For New Truck Series

Increased power, three entirely new engines, improved brakes, and a self-shifting transmission for some light models are among 50 new features and improvements in the new B-4 Series of Dodge "Job-Rated" trucks. They are said to meet 98 per cent of all hauling needs with 7 engines ranging from 100 gross horsepower in the ½-ton to 171 gross horsepower in the 4-ton models. Gross vehicle weights range from 4,250 to 40,000 pounds, and gross combination weights range up to 60,000 pounds.

The new Truck-o-matic transmission with gyrol fluid drive available for ½ and ¾-ton models brings driving ease to the truck field. The transmission has four speeds forward, plus one reverse speed, and requires no gear shifting in normal driving.

Further information may be secured from Dodge Division, Chrysler Corp., Detroit 31, Mich. Or use the Request Card at page 18. Circle No. 339.

Bushing Eliminates Close Hole Machining

A new bushing that is said to permit greater tolerance in machining of the locating hole has been announced by Aeroquip Corp., 303 S. East Ave., Jackson, Mich.

The bushing works by a series of minute cutting edges on the outside which cut their way into position with uniformly accurate results, according to the manufacturer. Once installed, the bushing is locked in position. As a result, greater variations in the size of the locating hole are said to be allowable. The normal hole tolerance of the conventional-type bushing is 0 to 0.0005 inch. This bushing is said to work satisfactorily with a maximum tolerance of 0.002 inch.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 286.

Carriage for Army's New Atomic-Shell Gun

The Army has unveiled its newest superweapon, an artillery piece capable of firing an atomic shell as well as other types of high-explosive projectiles. The first complex carriage and mount assembly of the big gun was produced at the Pittsburgh, Pa., plant of Dravo Corp., with Watervliet Arsenal manufacturing the gun barrel and breech.

The long thick steel barrel is mounted on a 38½-foot carriage which is transported by two tractor-type 6-cylinder Ordnance-Continental air-cooled gasoline engines of 375 hp, one at each end. On this carriage the gun can travel at least 35 mph. Not much larger than the heaviest field artillery piece now in service, the assembly can cross bridges capable of carrying any standard piece of equipment in an Army division.

The weight of the carriage is a vital factor—gun and carriage together weigh 85 tons—due to the necessity of transporting the weapon over bridges, culverts, and terrain which might not be sufficiently strong or stable to support it. At the same time, the carriage and its equipment has to be fabricated to resist the force of discharge recoil and stresses of being transported.

A 3-ton model in the new B-4 Series of Dodge "Job-Rated" trucks.

Ordnance designers specified use of many types of high-tensile, carbon, alloy, and stainless steels, plus lightweight aluminum and magnesium, and bronze and brass for the structural parts, castings, forgings, and fittings.

Nearly 2,200 separate blueprints govern the assembly, which all in all is described as one of the most significant advances in the annals of Army Ordnance.

How to Identify Iron Pipe

The constantly increasing number of new metals presents a difficult identification problem. A folder that describes four simple tests for the identification of wrought-iron pipe is being distributed by the A. M. Byers Co., Clark Bldg., Pittsburgh, Pa. Two of these tests—the fracture test and acid etching—do not require any special laboratory equipment.

This literature may be obtained from the company, or by using the Request Card at page 18. Circle No. 317.

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Because it's tougher and does a far better job than ordinary grease, *Texaco Marfak* is easily the world's most famous chassis lubricant. It *stays in* the bearings. Rough service won't pound *Texaco Marfak* out. Heavy loads won't squeeze it out. Thus, you get longer lasting protection against wear, dirt and rust . . . longer life for chassis parts and lower maintenance costs.

In wheel bearings, *Texaco Marfak Heavy Duty* gives similar top protection. It seals out dirt and moisture, seals itself *in* — assuring longer lasting lubrication and greater safety. It needs no seasonal change.

In engines — heavy duty gasoline or Diesel — use *Texaco Ursa Oil X***. It's fully detergent and dispersive, keeps engines clean for lower fuel consumption and maintenance costs. In crawler mechanisms, use *Texaco Track Roll Lubricant* for ideal protection against dirt, water and wear.

Call in a Texaco Lubrication Engineer. Let

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TEXACO

CONTRACTORS AND ENGINEERS

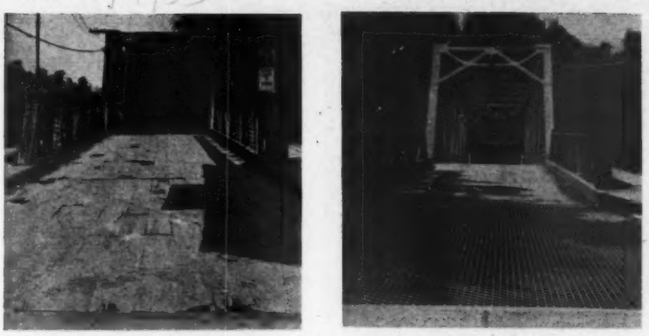
690.5 FC76 v.50 1953

Bridge Is Refloored—Traffic Doesn't Stop

With no interruption to traffic and for a cost of $50,000, Clendenin, W. Va., has converted an unsafe "ugly duckling" bridge into a safe, modern, graceful span.

The original 1923 structure served its purpose when Clendenin was a rural village. Since that time, although the town has blossomed into the trading center for the entire surrounding valley, the bridge has just gone on getting replacements of wood flooring and recoatings of asphalt. This proved to be not only inadequate for present-day loads, but also so dangerous that loaded school buses could not cross it.

In choosing an alternative solution to a new and costly bridge, Kanawha County had to consider the traffic problem as well as cost. The bridge was the only means of getting in and out of Clendenin and to close off the span for an extended period would have been a serious blow to the community. It was therefore decided to use Irving lightweight open-mesh steel decking, which would permit the existing bridge to carry heavier loads and could be installed without critically dislocating traffic. The contract was awarded to Permanent Builders, Inc., Clarksburg, W. Va. The work was supervised by Frank McEnteer, County Bridge Engineer.



Before and after the rejuvenation of the Clendenin, W. Va., bridge.

The contractor removed the old wooden planking and placed additional steel in the framework of the bridge, which was then completely refloored with steel decking, one lane at a time, with no interruption to traffic. The Irving decking was supplied by Fireproof Products Co., Charleston, W. Va.

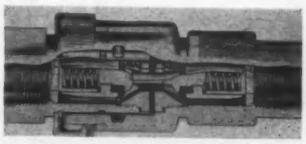
The bridge was designed with a 149-foot center span, a through Pratt-type truss, which is flanked on the north side by a 66-foot Warren pony truss and a 28-foot deck-plate girder. On the south side, it is flanked by a 78-foot Warren pony truss and a 35-foot deck-plate girder. Originally engineered to carry 15-ton trucks, with 10 tons on each rear axle and 5 tons on each front axle, the floor system is now designed for H15 loading (one 15-ton truck for each lane of traffic, with rear axles carrying 12 tons and front axles 3 tons).

Besides its new resurfacing (about 6,000 square feet of steel decking), the new span got a complete beauty treatment, including cleaning and painting. Clendenin's ugly duckling has become a swan.

Two-Valve Coupler

A make-and-break coupler with two shut-off valves has been introduced by Henry Valve Co., 3215 North Ave., Melrose Park, Ill.

The Wave-Flow Quick-Coupler has applications wherever pneumatic or hydraulic lines are involved.



As the two halves of the unit are coupled together, the two piston valves open by moving away from their respective seats. A soft molded insert, mechanically held in place, forms the seat in each half of the coupler. True alignment of pistons is said to be insured by long guides. Pistons can be replaced after long service, if necessary, by unscrewing seat bushings. An "O" ring in the socket half is said to provide positive seal while the coupling is connected. Protector caps are provided for covering coupler halves when disconnected. They are available in ½-inch F.P.T. connections.

Further information may be secured from the company. Or use the request Card at page 18. Circle No. 366.

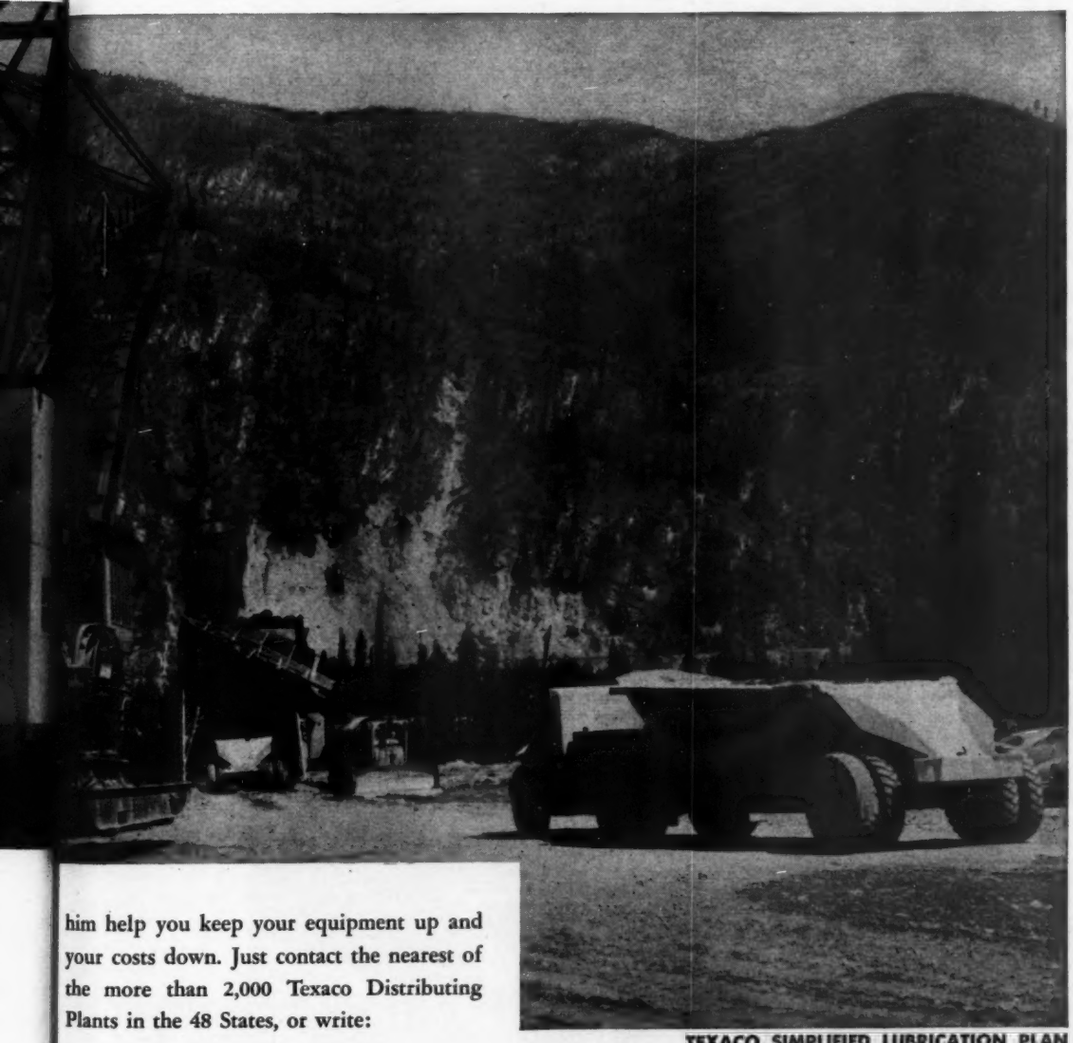
Chart on Anchoring Devices

A selector chart for anchoring devices is released by United States Expansion Bolt Co., 619 State St., York, Pa. The chart classifies each anchoring device according to load type, masonry classification, safe working load, and metal table.

The safe working loads are specified for each product from ⅛ to 1 inch and help to determine the proper size and number of anchoring devices to be used, depending upon weight of the object to be anchored. The figures are based on pull-out tests, according to the manufacturer.

This literature may be obtained from the company, or by using the Request Card at page 18. Circle No. 332.

ES MAINTENANCE COSTS



him help you keep your equipment up and your costs down. Just contact the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

☆ ☆ ☆

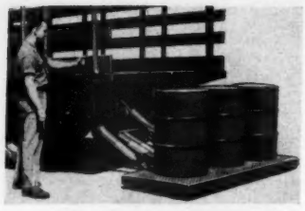
The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO SIMPLIFIED LUBRICATION PLAN helped build Hungry Horse Dam. "The time and confusion saved were incalculable," says contractor. Find out how you can handle all your major lubrication with *not more than six* Texaco Lubricants. Your Texaco Lubrication Engineer will give you all the facts.

Lubricants and Fuels
FOR ALL CONTRACTORS' EQUIPMENT

Hydraulic End-Loader

A new hydraulic end-loader for motor trucks is announced by The Galion Allsteel Body Co., Galion, Ohio. The Load-evator, which is adaptable to trucks of 1½-ton size and over, is available in four models with loading space of 28 x 84 inches to 34 x 90 inches. Load capacity is 2,000 pounds.



Power is supplied direct from the truck engine through a transmission-mounted power takeoff. The latter activates a Galion hydraulic hoist which lifts or lowers the end gate as desired. Action is controlled by a single spring-loaded lever which is said to assure constant safe operation. Special accessories include side loading ramps, support racks for gas and air-cylinder deliveries, and racks for double-decking.

Further information may be secured from the company by requesting Bulletin 652-L. Or use the Request Card at page 18. Circle No. 295.

Stationary Crushing Plants

A new 16-page catalog on stationary crushing, screening, and washing plants is issued by Pioneer Engineering Works, Inc., 1515 Central Ave., Minneapolis 13, Minn. The new bulletin explains the purpose, features, and specifications of Pioneer crushers, feeders, conveyors, vibrating screens, revolving screens, scrubbers, dehydrators, bins, etc.

Of particular interest to quarry, mine, and cement-plant operators are several pages of detail drawings covering stationary primary units. These units consist of the jaw crusher, apron, or grizzly-type feeder and power unit all mounted on a common skid.

This literature may be obtained from the company, or by using the Request Card at page 18. Circle No. 367.

Progress in Motor Grader Design

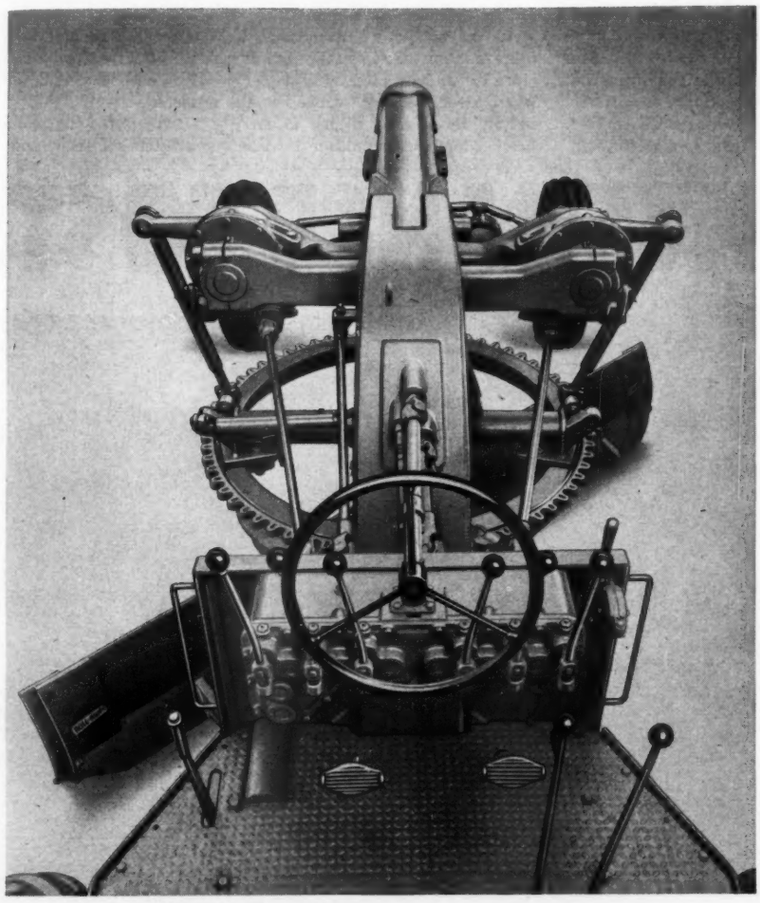
Allis-Chalmers new AD-40 shows importance of visibility. Operator can see front wheels — both ends of blade while he works.

A MOTOR grader operator has to be able to *see* his work to do a good job, whether he's rolling big windrows or doing highly accurate finishing.

Here is how Allis-Chalmers engineers made sure the new AD-40 met these requirements. They carried A-C's single member frame all the way from the front axle to the platform; cut down the size of the lift cases to eliminate blind spots; lowered the control box and eliminated assemblies from the front panel to provide better visibility of the work area directly in front of the operator; tapered the front edges of the platform so that he could see both ends of the moldboard as he works.

A-C fieldmen also knew that a grader operator likes to sit down whenever the job permits. So they've not only given him ample leg room for stand-up operation but also a steering wheel of adjustable height and a seat that rolls forward at a touch for sit-down operation.

Combined with a new kind of power steering, these advanced design features are making Allis-Chalmers AD-40 an increasing favorite with operators and owners alike because it means more work done with less effort. For more facts on the AD-40, it will pay you to see your nearby Allis-Chalmers dealer soon.



(above) Here is actual view operator has from platform of Allis-Chalmers AD-40, showing how well he can see both ends of the blade and both front wheels.

(below) The AD-40 has 104 brake horsepower, 23,000 pounds of weight and tandem drive traction, all it needs to do a better job on heavy duty construction . . . a faster job on maintenance.

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

Steel Beams Replace Rotted Pile Portions

Threat to a 14-Story Milwaukee Building Is Averted: Laborious Undertaking in Congested Space

• AN interesting but painstaking engineering job in Milwaukee, Wis., has saved from possible collapse a 14-story building in the heart of the city's business district. The structure, located on Wisconsin Ave., Milwaukee's main street, is the 45-year old Majestic Building, valued at over $2,000,000. Collapse was threatened when dry rot and the action of larvae affected the wood piling which supported the building, causing settling of the floor as much as 4 inches in some places. In fact, the danger of collapse was so serious that when a Milwaukee building-trade strike in April and May paralyzed all other construction, the unions allowed this job to proceed.

Fallen Water Table

Cracking of walls and settling of floors was first considered serious in June, 1951. The building owners, Founders Corp., called in Engineers Robert C. Johnson, President of Siesel Construction Co., Milwaukee, and the late Walter Hirschberg. Their investigation showed that the water table had fallen as much as 18 feet below its level at the time the building was constructed. The double-barreled action of dry rot and the larvae of round-headed borers feeding on the exposed wood had weakened the piling so much that some sections could be pulled apart with the fingers. In some areas the building weight rested on only a few good piles, and some of those had snapped under the strain. Had the ground been completely saturated, the dry rot would not have begun; neither could the larvae have survived to feed on the wood. But when the water level went down, the borers laid their eggs underneath the building and the larvae fed on the piles, weakening them.

When the building was built in 1907, the water table was at the basement-floor level. For support, the builders had driven 935 12-inch to 14-inch log piles an average of 40 feet into the silt and sand of an old tamarack swamp. The tops of the piles were 8 feet below the water level—therefore the piling was not treated for protection against dry rot. Now, although the water level in most downtown areas has risen so much that basements are often flooded, and although Lake Michigan a few blocks away is at an all-time high, in this particular area the level has dropped, leaving the pile tops unflooded and subject to dry rot. Engineers have not yet been able to determine the reason for the drop at this location.

(Continued on next page)

Siesel Construction Co., Milwaukee, Wis., used a once-famous theater as headquarters from which to operate the Majestic Building job. A CZ-192 Rex 6-inch Pumpcrete machine is on the right. *Photo Courtesy of Milwaukee Journal*

ANNOUNCING

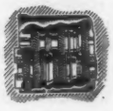
A new Dodge truck parade of power!

NEW! More powerful engines!
A parade of power! See the new Dodge "*Job-Rated*" trucks at your Dodge dealer's today. A total of 7 big, rarin'-to-go engines, including 3 brand-new power plants with high compression ratios and higher horsepower, greater cooling capacity, increased displacement, twin carburetion available on larger models. Plus famous features like 4-ring pistons with chrome-plated top ring, exhaust valve seat inserts.

In addition, the new Dodge trucks offer outstanding new brakes, new no-shift transmission, and over 50 other new features. See your Dodge dealer for the biggest truck buy on record!

For a truck, ½-ton through 4-ton that fits the job, see the NEW...

NEW! Extra-powerful brakes!
Stop easily on steep grades, fully loaded. Super-safe brakes give silky-smooth braking, reduced driver fatigue, greater load protection . . . new increased stopping ability on 1- through 2½-ton trucks! *PLUS* Dodge's oversize braking surface with Cyclebond linings.



NEW! Truck-o-matic transmission!
New Truck-o-matic transmission . . . available on ½- and ¾-ton models of Dodge "*Job-Rated*" trucks . . . saves shifting, cuts driver fatigue, lets you rock out of snow, mud, sand. Only Dodge offers shift-free Truck-o-matic! *PLUS* famous gyrol Fluid Drive, to lengthen truck life, protect your load.

NEW! Over 50 features!
50 ways new! Reinforced cab construction, improved exhaust system, extra-capacity radiators. Tinted glass, heaters with stepped-up heat output available. *PLUS* moistureproof ignition, high-torque capacity starting motors, and other dependability features. See your Dodge dealer.

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Now on display at Your Dodge Dealer's!

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"You See When Tank Is Full"

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★ Strains Fuel through Replaceable Strainer

SHELDON TRACTOR FILLER CO.
CUNNINGHAM - - KANSAS

Steel Beams Replace Rotted Pile Portions

(Continued from preceding page)

It was decided to replace portions of all 935 piles with steel I-beams. Siesel Construction Co. was engaged to do the work and members of the New York engineering firm of Spencer, White & Prentis were called in as consultants. Siesel moved onto the job and began work in December, 1951.

Work Space Was Tight

Space is always at a premium in the center of a large city. Fortunately, a handy solution was found to that problem on this job. Adjacent to the Majestic was the once-famous, but at that time vacant, Schlitz Palm Garden, later called the Garden Theater. Siesel took over this building as headquarters and dug a tunnel through to the Majestic basement. Siesel Superintendent Frank Rizzo set up his construction shack on the theater stage. Machinery was placed where Milwaukee audiences had sat to watch plays decades ago.

From this point on, it was a case of using ingenuity to solve each problem as it came up. First, Siesel sent 5 shafts to a depth of 15 feet below the Majestic basement floor. Then they dug lateral tunnels to provide access to each of the 935 piles. Only one or two could be replaced at a time in order that the building support should not be further weakened. This made the job slower and more arduous.

Rotted Portions Replaced by Steel

When a pile was exposed, the rotted portion—this was usually about the top 5 feet 6 inches—was cut off. For this difficult task the Siesel workmen used a Wright A-256 air saw equipped with two 18-inch blades moving against each other. This saw cut through the toughest piles in less than 20 minutes. Air for the saw was provided by a Le Roi 105 compressor, generating up to 110 pounds of pressure. The compressor was located in the the theater, a maximum distance of 250 feet from the saw.

Robert C. Johnson, President of the Siesel Construction Co., examines some of the new steel I-beams.

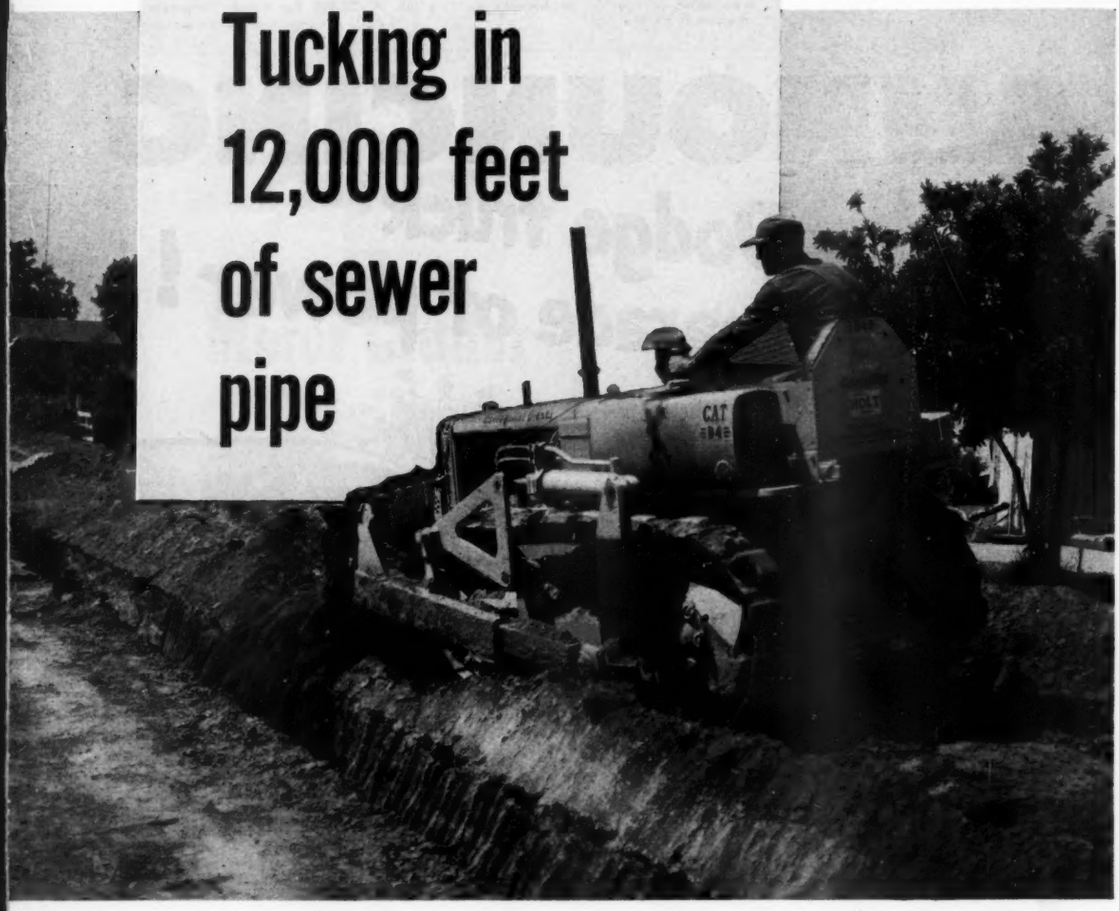
Photo Courtesy of Milwaukee Journal

Each pile portion was replaced by concrete-encased steel I-beam. This work was done in an interesting manner. Where the top of a rotted pile had been removed, a hole was left in the bottom of the pile cap. To fill it, Siesel filled a cheesecloth bag with dry cement grout and set it into the hole. A screw jack wedged a timber against the grout, squeezing it tightly until it had set. The timber was then removed and a 12-inch-square steel plate, 1 inch thick, was cemented to the bottom of the grout. Another 1 inch x 12-inch-square steel plate was placed atop the still usable portion of the wood piling. Between the two plates was placed a steel I-beam—usually an 8-inch beam. Two wedges were set between the beam and the top plate. Plates and beam were grouted in with high-early cement. When the cement had set, the wedges were driven in as tightly as possible. Finally the entire I-beam, from the pile cap down to wood piling, was encased in Perlite concrete pumped from the theater. The mix used was 5-bag to the yard. Perlite was chosen for this job because it is light and therefore would not add greatly to the existing load on the piling.

Concrete was delivered in trucks to an alley next to the theatre. A hole was cut in the theatre wall and a chute erected so the concrete dumped from the truck outside would slide down the chute into the remixing hopper of a CZ-192 Rex 6-inch Pumpcrete machine. (Siesel had purchased this machine in the thirties and is still using it.) From the mixer the concrete was pumped 150 to 300 feet to the individual pile locations. This was the first time Perlite had ever been pumped, as far as the contractors knew, but the results of the operation were satisfactory.

In order to get maximum support and protection from the concrete encasing the I-beams, the contractors built air tight forms around the steel beams and, using the Le Roi compressor to build up air pressure, forced the concrete in solidly.

Tucking in 12,000 feet of sewer pipe



No big equipment is tied up in this backfilling operation of a sewer installation in Stockton, Calif. The job is being done without strain by a hustling, powerful Caterpillar D4 Tractor equipped with a No. 4A Bulldozer.

The big equipment is out on bigger phases of the project. That's the way it should be. But to replace big tractors with small, you need a rugged, compact unit like the Cat D4 Tractor and 'Dozer owned by D. A. Parrish & Sons of Stockton.

After this barrel-chested unit finished backfilling 12,000 ft. of 10-in., 8-in., 6-in. and 4-in. pipe laid for a new sanitary district covering 20 square blocks, R. V. Parrish reported:

"The hydraulic angle blade handles like a charm and is especially useful on this type of work. This wonderful team enables us to get a lot of work done fast and well."

High praise? Sure, but it's understandable to anyone who has had a dependable, tenacious D4 Tractor working for him. Powered by an economical 4-cylinder Caterpillar Diesel Engine, its full load governed speed is 1,400 r.p.m. It develops 43 drawbar horsepower and 48 belt horsepower. And the No. 4A Bulldozer can be angled into three positions by one man.

The wide range of dependable Caterpillar Diesel Tractors and 'Dozers insures the proper equipment for your particular job. Stop tying up your big equipment on jobs beneath their capacities. Let your Caterpillar Dealer give you an eye-opening demonstration of the unit that will fit your job.

CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS

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DIESEL ENGINES
TRACTORS • MOTOR GRADERS
EARTHMOVING EQUIPMENT

Dumping was a tight squeeze. Dirt had to be wheeled down narrow tunnels in shop-made carts and emptied into trucks.
Photo Courtesy of Milwaukee Journal

When it had set, the forms were removed and the pump nozzle broken off. Then the entire process of digging, cutting, and placing of steel beam was repeated with another pile until all 935 piles had been replaced.

Tedious Dumping

Siesel used shovels with air spades for excavating. But on this project even the normally simple job of excavating was complicated by lack of dumping space. Siesel handled this part of the work in the following way. The earth was loaded in caisson buckets, which were pushed on carts Siesel had built itself. Workmen pushed the carts along the tunnels to the bottom of a shaft dug in the alley. There they were hoisted by a Harnischfeger Ziplift AA-2 hoist hung on a jib boom, and were swung out over waiting trucks and emptied into them. The workmen removed more than 2,200 yards of earth in this tedious manner.

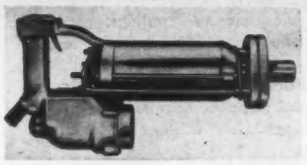
It would have been too expensive to refill the excavations with the same material, so the contractors brought in 1 to 2-inch-crushed stone, using the same caissons. The stone was lowered from trucks in the alley, wheeled down the tunnel on carts, and dumped. This stone was used as fill to a depth of 1 foot 6 inches. Above the stone Siesel pumped in 3-bag lean concrete, using the same Rex Pumpcrete machine.

Portions of all 935 piles have now been replaced with the concrete-encased steel beams, and each pile is capable of carrying at least 50 tons. There has been no settling at the site since the rotted piling was replaced.

Will Raise Water Table

Although dry rot is still a problem with steel beams, the owners have a plan to prevent rotting in the future. They intend to protect the piles by raising the water level to where it was in 1907—the basement-floor level. Details for doing this have not yet been worked out, but probably automatic sump pumps will be installed to flood the area whenever the water level goes down too low.

Hammer Drill Rotates



A new 2-inch-capacity heavy-duty electric hammer drill has been brought out by the Syntron Co., 227 Lexington Ave., Homer City, Pa. According to the manufacturer, it combines the power of the company's largest electromagnet hammer with automatic rotation of a spiral-fluted carbide-tipped drill bit. A rubber-ratchet mechanism recoiling with each blow of the hammer piston turns the bit. The 3,600 blows per minute of the hammer piston rotate the bit with considerable torque at the proper speed. This automatic drill-bit rotation eliminates the manual quarter turning of a drill bit, reducing operator fatigue. Drills are available in a variety of hole diameters.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 315.

Do you need information on equipment? Perhaps we can supply it—just use the Request Card, page 18.

Data on Insulation Products

An 8-page booklet on its line of products for cold-insulation construction has been prepared by the American Bitumuls & Asphalt Co., 200 Bush St., San Francisco 4, Calif.

With detailed charts, photographs, and tables plus complete easy-to-read descriptive material, the booklet provides valuable data on typical applications of Laykold insulation adhesive, cement, and Weathercoat. These asphaltic products are applied cold with spray, broom, or trowel.

This literature may be obtained from the company, or by using the Request Card at page 18. Circle No. 256.

333,333 YARDS TO THE MILE...
AND A LORAIN 820 FOR EVERY MILE!

Rock-ribbed New England is a rugged proving ground for *any* shovel. The 22 ft. rock cut in the photo is one of the many tests of shovel performance on the new Boston to Lowell Turnpike. 1,500,000 yds. will have to be moved on this 4½ mile section near Bedford, to build a dual, 34 ft. wide, modern highway.

Peter Salvucci, Boston, Mass., has a $2,036,000 contract on this job. The big 2-yd. Lorain shovel, Model 820-J, shown in the cut is but one of 14 Lorains he has purchased over the years for his New England jobs. Contractor Salvucci could not afford to repeat with Lorains time after time, year after year, had not these rugged machines stood the repeated rock tests to which he has subjected them.

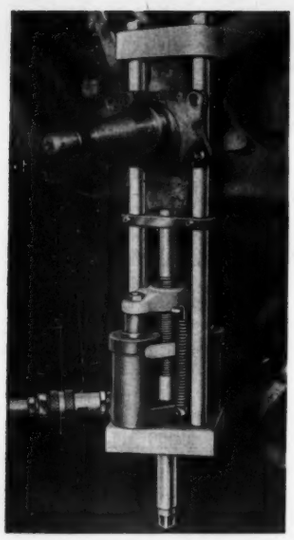
When you think of rock, you've got to think of a shovel that can really take lots of punishment . . . shocks and impacts . . . that can keep on crowding into a rocky face no matter how tough the going, with its "never-say-die" power.

The big 2-yd. Lorain "820" solves those problems. With its Hydraulic (fluid drive) Coupling, shocks and stresses can't reach turntable mechanism or cables because they melt away in the Fluid Drive. The engine cannot stall under any digging circumstance — again, the Hydraulic Coupling allows full power to be applied at all times. You get real rock busting — not shovel busting performance with the big "820" on your rock job.

When you think of rock . . . think of your Thew-Lorain distributor . . . and the line that offers you greatest values for the toughest of digging. Other jobs will come easy.

THE THEW SHOVEL CO., LORAIN, OHIO

NO ROCK CAN STOP A THEW LORAIN 820



A Kingpin Pusher

A new hydraulic pusher for removing car and truck kingpins in minutes has been developed by Owatonna Tool Co., 381 Cedar St., Owatonna, Minn.

The Power-Twin hydraulic ram supplies the power for the pusher. It is detachable and can also be used for pulling and installing bearings, gears, sleeves, bearing outer races, pinions, sheaves, pulleys, etc. The portable unit provides 17½ tons of power with fingertip control.

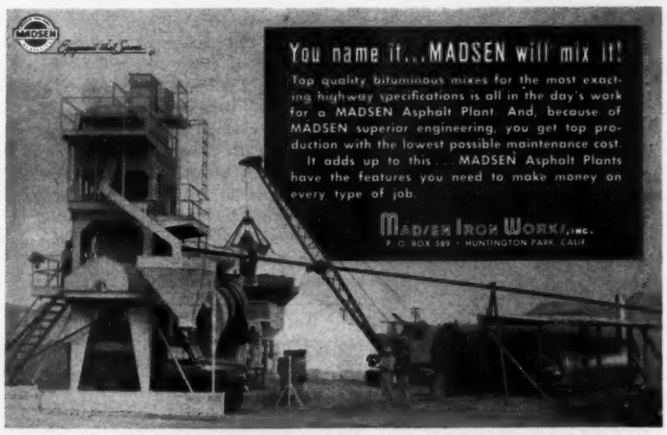
Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 260.

Bottle-Gas Melting Furnace

A new furnace, fired by L-P (liquefied-petroleum) or bottle gas, is described in an illustrated folder by Hauck Mfg. Co., 124-136 Tenth St., Brooklyn 15, N. Y. It is designed for melting and heating joint compound, asphalt, tar, and similar materials. The company offers five models, three wheel-mounted and two on bases. Pot capacities are 25, 15, 10, and 4 gallons.

The catalog points to such features as enclosed burners with no flame impinging on the pot, adjustment by a single-burner valve, and carbon-free performance. The furnaces can be used with either the top-connection or side-connection-type gas cylinders.

This literature may be obtained from Hauck by requesting Bulletin 1077, or by using the Request Card at page 18. Circle No. 297.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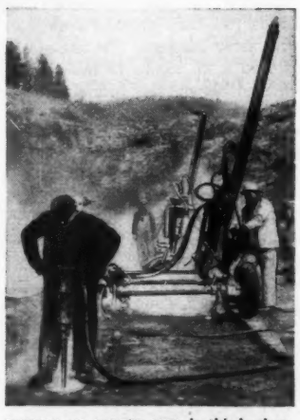
Here it is . . . biggest and most powerful of all Blue Brute Portable Compressors! This 600' unit *really* costs less to operate, with its *low* fuel consumption and the *minimum* maintenance it calls for.

Just check these Worthington features it incorporates:

Air-operated fuel-saver control that keeps fuel consumption way down (never a pound of unnecessary air pumping, automatic unloading at idling speeds, engine speed in ratio to air requirements) . . . hydraulically controlled clutch for really easy operation . . . identical stack-type, oil-bath air cleaners on engine and compressor for easy servicing . . . two full-length tool boxes with ample capacity . . . two-piece side panels for better temperature control and easy handling by one man . . . unit core radiator and intercooler, offering maximum cooling surface . . . frame protected fuel tank for easy, low level filling . . . three-point engine and compressor mounting . . . formed steel channel frame, semi-elliptical spring mounting and automotive-type steering.

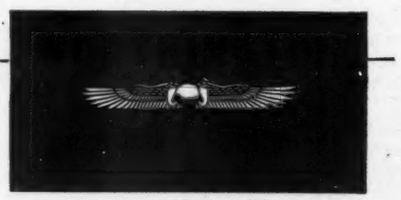
There's even more you'll want to know about this new portable compressor. Write for Bulletin H-850-B74 to Worthington Corporation, Construction Equipment Division, Plainfield, N. J.



ENOUGH AIR IS LEFT OVER in this hookup with the new Blue Brute 600' and with two 4-inch wagon drills to operate the heavy-duty rock drill in foreground!

H.2.4

If It's A Construction Job, It's A *BLUE BRUTE* Job



Large-Scale Plant Is Built on Sand

Vibroflotation Compaction Method Packs Sand Grains Tightly, Makes Solid Mass for Foundation

• SAND doesn't sound like the best foundation on which to build a large plant, but that is just what The Rust Engineering Co., Pittsburgh, Pa., is doing. The secret is in the compaction.

The Bonnie Phosphate Chemicals Plant is being constructed at Bonnie, Fla., for the International Minerals & Chemical Corp., Chicago, Ill. By the use of Vibroflotation—a process invented by Sergey Steuerman, New York, N. Y.—the plant is being constructed on dry wasteland sands with no support other than the sand itself. The entire project, which will be completed early this year, will cost $12,000,000. This represents a saving of over $250,000 as compared with construction of such a plant on more conventional foundation soil.

An Unpromising Site

International Minerals chose the barren plant site near Mulberry, about 8 miles from Bartow, Fla., because of its proximity to the Bone Valley gravel from which the company recovers phosphate. The contractor faced a foundation problem at this site, since its soil must support not only heavy structures but take shock and vibratory conditions without settlement (which would be highly damaging to the process buildings with their maze of piping and chemical apparatus).

Soil studies showed that underlying the site were: an uncertain base of loose sand; a "sandy matrix stratum"; and a third layer of compressible sand and gravelly clay. These three layers together reached a depth of some 60 feet and only below that did the surveyors find a suitable bearing stratum.

Rust engineers suggested the use of Vibroflotation for sand compaction, since pilings would be substantially more expensive and might give less stable support. The process was begun after thorough tests and independent reports of soils and engineering authorities confirmed and endorsed the original recommendation for its use.

What Is Vibroflotation?

The Vibroflotation process increases the relative density of sandy soil through a shaking and pushing process that packs the sand grains

(*Concluded on next page*)

A test pit dug through an area compacted by Vibroflotation. The dark areas are the original soil and the white ones indicate the clean sand added as the Vibroflot was withdrawn. Jagged and circular holes in the sand-wall face are the result of test boring and digging.

California Contractor cuts curb costs with Pacific Clamps

Hall Bennett, Contractor, Oakland, California, cut construction down time and saved many valuable man-hours by using Pacific all-steel re-usable Clamps on a recent integral curb job.

On any job involving curbs, integral curbs, or curbs and gutters, Pacific all-steel Clamps eliminate wood stakes, minimize nailing—get the job done faster and more economically. One set of clamps handles all jobs. One carpenter and one laborer can keep ahead of concrete crew on average job. Clamps adjust from 4" to 10" curb width; to 36" height; and any batter.

Write for Bulletin C and prices.

PACIFIC ENGINEERING SALES CO.
3938 Wilshire, Los Angeles 5, Calif.

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These handy, easy-to-use catalogs take the headaches out of ordering clutch plates, facings and brake linings for your earthmoving equipment. Because each parts listing gives you *all* the information you need to select and install the Velvetouch part you need . . . fast.

They're individualized, cross-referenced catalogs, too . . . one for Allis-Chalmers equipment, one for Caterpillar, one for International and one for LeTourneau . . . so that you don't have to thumb through dozens of unrelated sections to find the item you want.

Use the convenient coupon below. Now! And we'll send your catalogs to you immediately. Velvetouch friction products are "standard equipment" with leading manufacturers . . . and they should be standard with you!

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* LOS ANGELES—1110 South Hope St., Los Angeles 15, Cal.
* TORONTO, ONTARIO—The S. K. Wellman Co. of Canada, Ltd., 2539 Dufferin St.
* CLEVELAND—200 Egbert Rd., Bedford, Ohio
* PHILADELPHIA—1845 West Belfield Ave., Philadelphia 41, Pa.
** WASHINGTON—1100 Vermont Ave., N. W., Washington 5, D. C.
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** EXPORT DEPARTMENT—8 South Michigan Ave., Chicago 3, Illinois

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Your individualized catalogs sound good to me. Send me the copies checked, without obligation. Allis-Chalmers ( ), Caterpillar ( ), International ( ), LeTourneau ( ), friction parts list for (_____) equipment.

Company _____

Address _____

City, State _____

Signed _____

Closeup of the vibrating end of the Vibroflot. In the upper half is housed an electric motor which drives an eccentric shaft located in the lower half.

Plant Built on Sand

(Continued from preceding page)

more tightly together and reduces the voids or empty spaces between the particles. A much more solid sand mass results.

The device used, called a Vibroflot, consists of a tube which is vibrated by an electrically driven eccentric inside it, producing a 10-ton centrifugal force. This apparatus is attached to a follow-up pipe which houses required water and electric lines. A displacement of about ¾ inch in each direction off center is facilitated by a universal joint between the Vibroflot and the follow-up pipe.

In operation the Vibroflot is suspended from a crane and guided by vertical wooden leads. Vibrating at full speed, it is lowered into the sand while a water jet at its tip forms a saturated sand mass or temporary "quicksand" condition, into which the vibrator rapidly sinks. Lowered to an average depth of 13 feet, the device by its vibrating action pounds the sand surrounding it into a tighter mass on all sides. Fresh sand is shoveled in from above to fill the extra space emptied by this compaction.

The vibrator is withdrawn in 1-foot stages, being run at each until the sand is packed as solidly as possible at each stage. An average of 2½ cubic yards of fresh additional sand is added by the time it is fully withdrawn. The result is a tightly compacted sand column about 8 to 10 feet in diameter. The columns are pounded in a predetermined overlapping pattern with about 8 feet between centers. The pattern greatly strengthens the compaction results, which give a relative density of 70 to 100 per cent—more than enough for high or very high bearing capacity.

The complete compaction at Bonnie plant took two crews 160 days for some 3,350 compactions. Results show, after 6 months, that one of the first structures completed —the phosphate-storage building— has experienced no measurable settlement. Advance estimates had allowed for a maximum settlement here of about 1 inch.

Interesting Potentialities

Success of this new "foundation" concept may well mark a milestone on the path to greater use, for industrial-plant building, of hitherto economically unattractive sand areas such as river basins, shorelines, and deserts. Rust Engineering sees a future for the technique in the construction of earth dams, cofferdams, levees, and airport construction in sandy areas, as well as heavy-industrial plants with vibrating equipment. Another special use is in water-retaining dams and underwater structures where Vibroflotation concrete can create unusually tight structures.

Concrete-Form Panel

Production of a new hardboard panel for concrete forms is announced by Anacortes Veneer, Inc., Anacortes, Wash. According to the manufacturer, Armorbord is shock-resistant and flexible; a strip of board ⅛ inch thick can be bent into a tight circle about the size of a hatband without cracking the surface.

The board is light tan with a hard wear-resistant surface. It is made in ⅛, 5/16, and ¼-inch thicknesses, is flexible in the ⅛-inch thickness, and rigid in the ¼-inch panel. According to the manufacturer, the board's resistance to impact and its flexibility make it suitable for curved concrete forms.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 268.

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Timberlock Split Rings comply with all Government specifications as to manufacture and material. Their excellent quality, favorable price, prompt service and acceptability have been proved by their satisfactory use in many projects under the jurisdiction of the Army, Navy, Maritime Commission, Defense Plant Corporation and various other governmental agencies.

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Lime-Rock Base Course For Runway Extension

Topped With Plant-Mix to Lengthen Runway At Moody Air Force Base in Georgia

By WILLIAM H. QUIRK
Editor

A Clarktor-6 pulls a Tampo pneumatic roller on the compaction of the lime-rock base course on the Moody Air Force Base job in Valdosta, Ga. J. D. Manly Construction Co., Leesburg, Fla., was the contractor. *C. & E. Photo*

• MILITARY construction for the Army and the Air Force bulked large last year in the busy program handled by the Savannah (Ga.) District of the U. S. Corps of Army Engineers. One of the more important projects on the 1952 schedule included runway and taxiway construction at Moody Air Force Base, Valdosta, in southeastern Georgia. The era of the jet plane demands long ribbons of pavement for landings and takeoffs. Consequently one of the 5,000-foot runways at the field was extended to 8,000 feet as the principal feature of a $448,700 contract held by the J. D. Manly Construction Co. of Leesburg, Fla. Work started in February, 1952, and was completed in September.

Moody Air Force Base lies 11 miles northeast of Valdosta in Lowndes County, which borders the Florida state line. State Route 125 and the Georgia and Florida Railroad give access to the field. Before the current improvements got under way, facilities included four runways—a 5,000-foot east-west, a 5,000-foot northwest-southeast, and a paralleling pair of north-south runways.

Of the latter, the 5,000-foot westerly runway of the pair was extended to 8,000 feet with an addition at the south end. The easterly paralleling runway was reconstructed for 840 feet at the south and 1,160 feet at the north end. In those areas the original base course was in need of strengthening. This runway is 7,000 feet long. Construction of connecting taxiways and hardstands were also included in the contract.

Type of Construction

Runways are 150 feet wide and are crowned at the center line, with a 1.5 per cent slope to the edge of the pavement. Flanking shoulders, 175 feet wide, are on a 2 per cent slope. Taxiways have 50-foot pavements and 50-foot shoulders with the same slope as the runways.

The 3,000-foot runway addition consists of a 6-inch compacted lime-rock base course, 151 feet in width, so as to extend 6 inches beyond the pavement on each side. A bituminous-concrete surface course of 1½-inch compacted thickness was laid on the top of the base. The taxiway is of similar construction, with the lime-rock base course measuring 51 feet wide.

On the reconstruction sections, crushed stone graded from 1-inch down was laid over the existing base

(Concluded on next page)

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3. Longer lasting
4. Easy to use
5. Economical for all type Jack Hammers
   ⅞" Socket in 9 sizes, 1¼" to 1¾"
   1" Socket in 9 sizes, 1" to 2¼"

CONVENTIONAL ROCK BITS GIVE WAY TO IMPROVED MODERN DESIGN

Write for prices and full details

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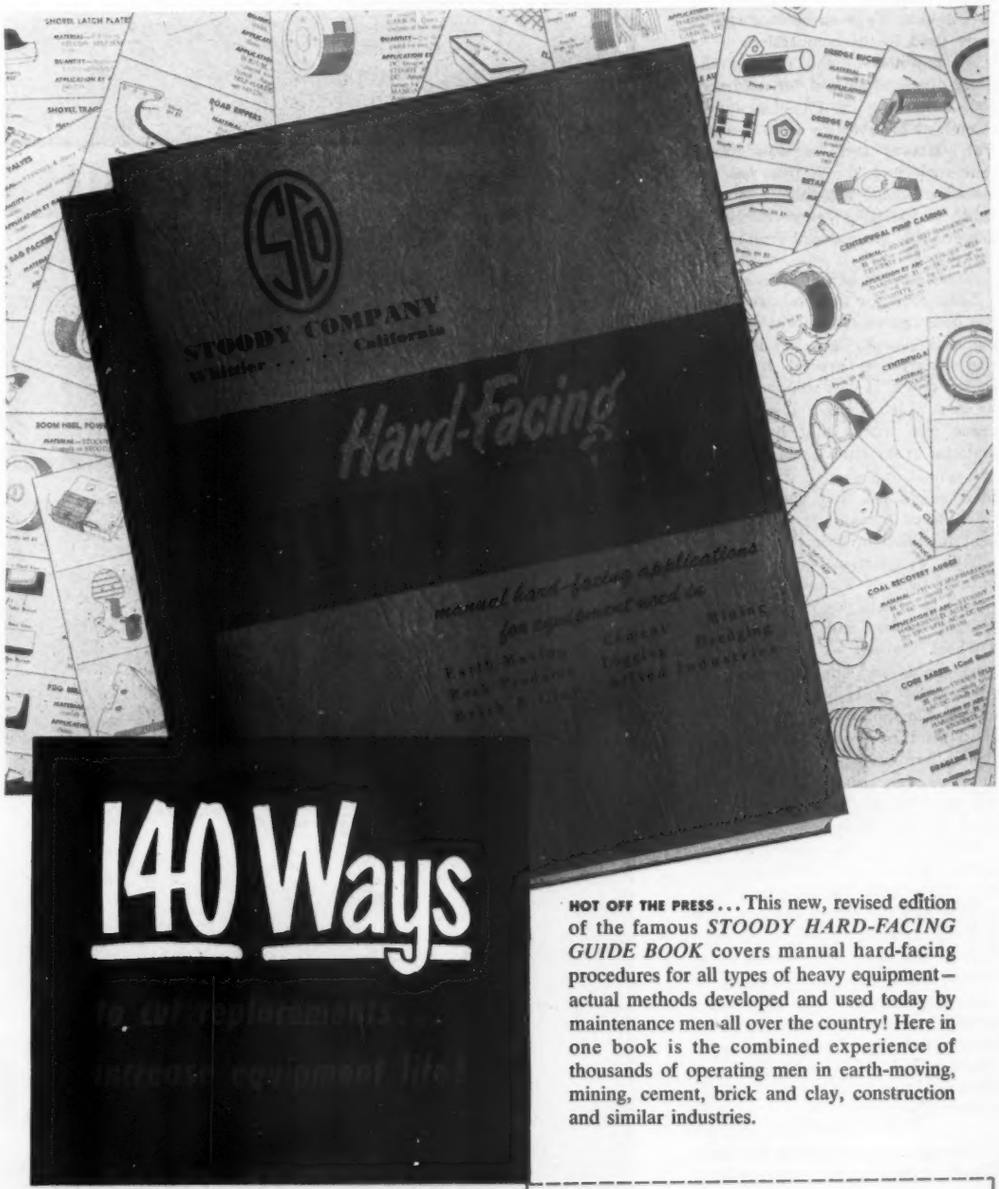
4200 N. W. Yeon Ave., Portland 10, Ore.



HOT OFF THE PRESS... This new, revised edition of the famous *STOODY HARD-FACING GUIDE BOOK* covers manual hard-facing procedures for all types of heavy equipment—actual methods developed and used today by maintenance men all over the country! Here in one book is the combined experience of thousands of operating men in earth-moving, mining, cement, brick and clay, construction and similar industries.

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No cost, no obligation; just fill in and return the attached coupon or request the GUIDEBOOK on your letterhead! Also, if you are interested in automatic welding for rebuilding and hard-facing, we'll be glad to include information.

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Lirue-Rock Base Course For Runway Extension

(Continued from preceding page)

as a keystone or binder course. This was given a bituminous tack coat prior to the laying of the plant-mix surfacing.

Grading

Unclassified excavation totaled approximately 270,000 cubic yards, and the grading was handled by the following equipment:

4 Caterpillar DW10's with No. 10 scrapers
2 LeTourneau Carryalls pulled by D7 trailers
1 Insley ¾-yard dragline
1 Bucyrus-Erie ¾-yard dragline
6 Diamond T dump trucks
2 Caterpillar dozers—a D8 and a D7
4 Caterpillar No. 12 motor graders.

Fill embankments were put down in 8-inch lifts and compacted to 95 per cent maximum density at optimum moisture according to modified AASHO standards. The top 6 inches of the subgrade was compacted to 97 per cent. Four sheepsfoot rollers were used in the compaction.

At the end of the runway the ground was stabilized for a further 200 - foot - long x 150 - foot - wide stretch as an overrun area. Seaman Pulvi-Mixers and harrows mixed lime-rock and the native soil together in about two-third and one-third proportions respectively to achieve the desired stabilization.

Lime-Rock Base

Lime rock for the end areas and the base course came from the Williston Shellrock Co. of Haile, Fla.; the material is graded from 3½ inches down. It was shipped by rail in cars which were unloaded by a crane into trucks that hauled the material to the runway. Motor graders spread and shaped the material in a single lift that was 6 inches thick after compaction to 100 per cent modified proctor density.

This compaction was achieved with a pair of Tampo rubber-tire rollers, a Cedarapids rubber-tire vibrating roller, and three 10-ton, 3-wheel rollers — two Buffalo-Springfields and one Hercules. The rubber-tire units were pulled by either Clarktor-6 or International ID-9 tractors. Usually the rubber-tire rollers were put on first to develop the necessary density, while the steel-wheel rollers obtained the final smooth finish.

Water, of course, played an important part in getting the compaction. Three tank trucks—one of 5,200 gallons and the others holding 2,000 gallons—sprayed on the water from bars at the rear. A tolerance of ¼ inch in 15 feet, checked by a straightedge, was required in the base work. If more material was required to reach proper grade, the lime rock was scarified with a motor grader to form a better bond.

Paving Operations

After the lime rock base was completed, it was given a prime coat of RC-1 asphalt applied at the rate of 0.15 gallon to a square yard by an Etnyre 1,500-gallon distributor. This was in preparation for the 1½-inch bituminous-concrete surface course that was laid in 10-foot lanes by a pair of Barber-Greene spreaders. Two Galion 8 to 10-ton tandem rollers, 1 10-ton 3-wheel roller, and 1 traffic roller compacted the material.

The contractor set up a Barber-Greene continuous-mixing plant on the site and hauled the hot-mix to the finishers in 6 trucks. Average haul was 1 mile. The mix consisted of crushed granite, screenings, and asphalt cement-penetration 85-100. It was laid at a temperature range of 250 to 325 degrees F. On the reconstruction work a keystone course was required in places before the surface was laid. The two mixes, surface course and feathering course, conformed to these gradations:

An Insley dragline with a 40-foot boom and a Hendrix ¾-yard bucket loads a Diamond T truck. *C. & E. Photo*

Sieve Size	Per Cent Passing Surface Course	Feather Course
¾-inch	100	....
½ inch	91-99	....
⅜-inch	82-90	100
No. 4	62-70	91-99
No. 10	49-55	62-68
No. 20	36-42	43-51
No. 40	28-34	33-39
No. 80	16-22	16-22
No. 200	4.0-7.0	6.6-9.6
Asphalt	5.1-5.7	6.4-7.0

The Tyrone Rock Products Co., Atlanta, Ga., supplied crushed granite for the coarse aggregate in the mix. Sand was local material, while the screenings came from Weston-Brooker Co. at Granite Hill, Ga. The Mexican Petroleum Co. furnished the bitumen which was delivered in tank cars from Port Wentworth at Savannah, Ga. A Lima crane with a ¾-yard clamshell bucket unloaded the aggregate and stockpiled material at the asphalt plant.

Quantities and Personnel

Major items in the airport improvement project included the following:

Unclassified excavation	270,000 cu. yds.
Lime-rock base course	84,200 sq. ft.
Lime rock for stabilization	4,000 tons
Bituminous concrete	9,400 tons
Bituminous keystone course	34,500 sq. yds.
Bituminous prime and tack	175,200 gals.

The J. D. Manly Construction Co. employed an average force of 60 in its contract under the direction of Gene Gilbert, Superintendent.

For the U. S. Army Corps of Engineers, James A. Hearn is Area Engineer, and L. L. Hampton is Project Engineer. The Savannah District is headed by Col. Robert Erlenkotter, District Engineer. E. F. Gunn is Chief, Construction Division.

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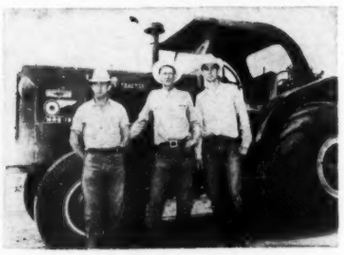

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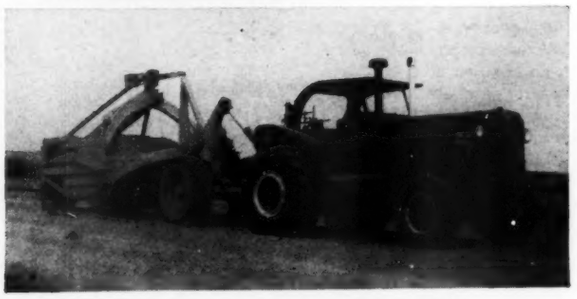
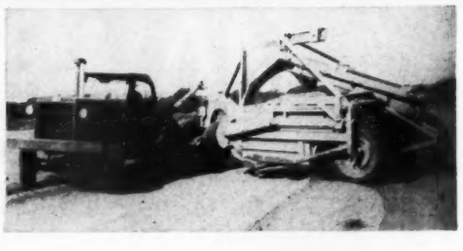


Top left shows Cecil Weld
his two sons, Bob and Dic
rancher and land leveling
tor. Joe Weldon, another
in the Army.

The picture at left shows th
190 self-loading a 12 cu. y
Le Tourneau L.P. Scraper.

Lower left shows the short
radius of which the M-R-S
scraper is capable.



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Heretofore other prime
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tires sufficiently to wi
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hauling heavy payloa
high speeds. This r
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equipped with 14-ply
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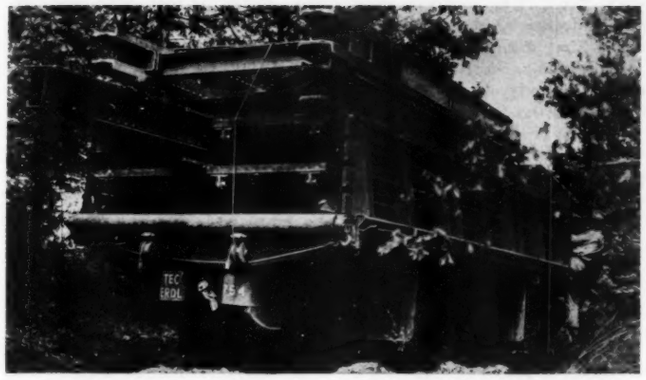


Brought by truck to the site of erection, (left), the army's new T6 tactical aluminum bridge is capable of manual erection and will support the load of a full-dress army division on the move. The above picture indicates the light weight of the structure.

New Tactical Bridge

After five years of design, development, and testing, Army engineers at the Fort Belvoir, Va., Engineer Research and Development Laboratory, with the help of private industry, have done it again. Developed with the cooperation of Aluminum Co. of America and Pittsburgh-Des-Moines Co., a new aluminum fixed bridge, referred to as T6, can be erected faster than any other heavy tactical bridge. It is wider and can not only support about 50 per cent greater loads than comparable World War II bridges, but also, with some minor changes, can be used by a full-dress army with its heavier equipment for spanning rivers and deep ravines.

The 75-foot length of bridge can be normally erected in one-third the time required for the same length of the old Bailey bridge and can span 180 feet while maintaining division-load capacity. Reasons for the reduction in construction times are the light weight of the aluminum (60 per cent of the weight of a comparable steel bridge) and simplicity of detail.

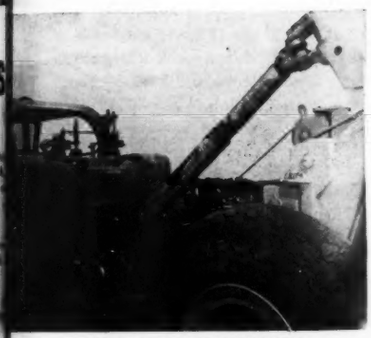
The bridge is put together in sections with the floor beam resting on the lower horizontal member of the truss panels. Four deck panels stretch over the floor beams for the widened roadway. A feature of the T6 is its easy adaptability from divisional use to use by a full-dress army.

All in all, the T6 has stacked up more tricks than any other tactical bridge to date.

...truck capacity scrapers and powering 20 yard struck, 25 yard heaped scrapers *pusher loaded*.

...OWERFUL rubber-tired
...RIME MOVER
...-R-S 190

"DIRT-MOVIN'EST TRACTOR I'VE EVER SEEN!" ...
says Bill Hannickel, land-leveling contractor of Fresno!



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...ressure for efficient ... speeds. ... loading, a hydraulic ... controlled by the op... transfers the weight ... front of the scraper ... tractor itself. This ...s out" the tires, with ...ent marked increase ...on surface. This is the ... of the tractor's ex... performance. ... the scraper bowl has been filled, the hydraulic pressure is released, returning all of the load back to the scraper, and the tractor's tires are relieved of the temporary flattening effect, which is harmless at low loading speeds. This feature also prevents the transfer to your tractor of the harmful effects of pounding and surging of the scraper during hauling.

Bill Hannickel shown above. Center shows Bill with a heaped load doing a land leveling job on the H. W. Deavenport ranch at Five Points. Another feature Bill likes is the fact that this tractor may be easily detached from the scraper and used for numerous other draw-bar jobs required on earth-moving and land leveling projects.

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Road-Stabilization Data

Gravel roads that have been stabilized with rock salt reduce costs by cutting maintenance operations from 150 round trips per year to 20 or less, according to a new booklet put out by the International Salt Co., Inc., Scranton 2, Pa.

This booklet reports that such roads give long years of service and increase traffic safety because they provide a safe hard surface on which to drive. They are not slippery when wet, do not form into ruts, and, in dry weather, are not dusty.

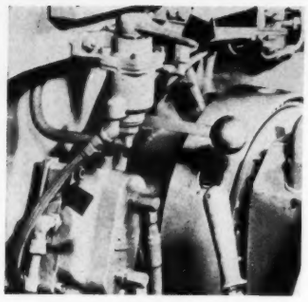
The booklet contains specifications about the type and quantity of aggregates that should be used for best results in a road stabilized with rock salt and gives data covering the amount that should be added. It tells how to achieve proper compaction of the materials and illustrates how to add rock salt and how to mix the aggregate.

This literature may be obtained from the company, or use the Request Card at page 18. Circle No. 360.

Guide to Pump Selection

A guide for selecting centrifugal pumps has been released by Allis-Chalmers Mfg. Co., 951 S. 70th St., Milwaukee, Wis. The 12-page booklet covers general-purpose, double-suction, multistage, marine, and axial and mixed-flow pumps. Special-purpose pumps mentioned include solids-handling, sewage, rubber-lined, process, fractional-horsepower, and coolant and circulating units. There is a head-capacity table for single-stage double-suction pumps.

This guide may be obtained from the company by requesting Bulletin 52C6059J. Or use the Request Card at page 18. Circle No. 316.



Flexible Metal Hose For Crane Air Lines

Convoluted flexible metal hose with a round-wire-braid reinforcement has been used for air-brake and air-operated transmission-control lines on the Unit No. 357 mobile crane, according to Titeflex, Inc., 500 Frelinghuysen Ave., Newark 5, N. J. Maintenance on these lines hinges on preventing any air escape which might cause loss of braking power or transmission control.

In general, the problems involved piping of compressed air from a reservoir tank, through 2-way brake and transmission-control valves, and a vertical propel shaft, to a central rotating joint in the undercarriage of the crane. From the central rotating joint rigid pressure lines carry compressed air impulses to front and rear-axle brake pistons and to the 2-speed air-operated transmission.

According to the manufacturer, the flexible metal hose withstood vibration during operation; there were no signs of fatigue stressing or metal wear. In addition, the flexible metal hose is said to have acted as a vibration absorber to eliminate strain and wear around couplings. The in-field tests also showed that a second reinforcing layer of flat-ribbon wire braid around the outside of the air-line tubing added resistance to internal pressure and external damage which might be caused by accidental mishandling and the corrosive action of spilled lubricants and acids.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 292.

New Degreasing Unit

A new degreaser for cleaning small and medium-sized shop parts is announced by Detrex Corp., Detroit 32, Mich. The VS Jr is available in an electrically heated and a steam-heated model. Both degreasers may be moved.

Parts are suspended in solvent vapor which dissolves soils of dirt and grease. A spray of hot solvent flushes away any loose soils which remain. Finally, a rinse in solvent vapor leaves the work clean and dry. Work may be carried in and out of the degreaser either by hand or a small hoist. The equipment is 48 inches from the top to the base.

The interior is coated with Detrex FF-1, the new nonporous coating which is said to be corrosion-proof and unaffected by degreasing solvents. The manufacturer claims economy in initial cost and in operating and maintenance cost. To install, attach the water supply and plug in the electric model or connect a steam line to the steam-operated model.

Further information may be secured from Detrex. Or use the Request Card that is bound in at page 18. Circle No. 294.

Tractor, Dozer Booklets

Two tractors and a bulldozer are the subject of recent catalogs issued by the Caterpillar Tractor Co., Peoria 8, Ill. They are shown in use with companion equipment.

The 225-hp DW20 prime mover is teamed with DW20 wagon, No. 20 scraper and Athey PD20 Q trailer (Form 30334). Form 30505 describes the DW21 tractor with No. 21 scraper. Form 30504 diesel tractors with bulldozers are pictured doing pioneering, stockpiling, stripping and general earth-moving.

This literature may be obtained from the company, by using the Request Card at page 18. Circle Nos. 334, 335, 336 for Forms 30334, 30504, 30505 respectively.

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...gives lowest cost per foot of concrete drilled with a TILDEN Rotary Konkrete Kore Drill. Two-thirds more cutting surface make Tilden 70% more efficient. Drills 5 to 7 times more holes without resharpening — even reinforced concrete. Free factory resharpening! Use with any electric or air drill. 29 standard sizes, 3/16" to 4". Interchangeable shanks up to 60".

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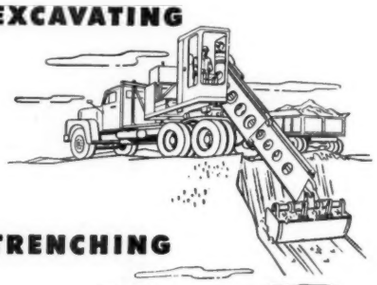

TRENCHING

Many machines in one!

Little wonder that this versatile machine is called the *Multi-Purpose* Gradall Construction Machine! It does the work of several one-purpose machines. For instance, in pipe line work it digs the trench, lays the pipe and backfills to complete the job.

DO IT ALL WITH GRADALL!

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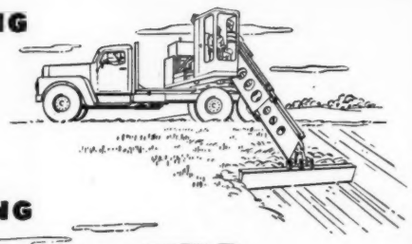
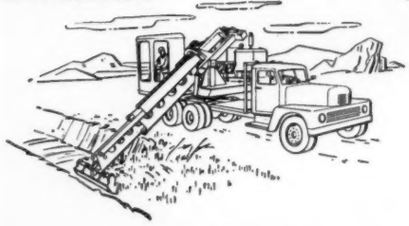


DITCHING



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Operated by power hydraulics, the boom can be extended or retracted, lowered or raised, tilted each way from horizontal, and rotated on a horizontal plane. The rotating platform is mounted on a pneumatic tire engine-driven chassis.

Attachments for various applications are attached to the boom, and are quickly interchangeable . . . only a few minutes to change over.

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Design Handbook Covers Welded Highway Bridges

"Welded Highway Bridge Design", recently published by The James F. Lincoln Arc Welding Foundation, presents significant designs and details of welded bridges submitted in the Foundation's through-highway bridge-design competition. This 240-page book, bound in stiff cloth, discusses: structural types, floor systems, new sections, connections and details, and quantities and costs; arches, trusses, and other types of designs; floor systems including concrete, steel grid, and steel plate; and new sections suggested for plates, tees, beams, channels, and angles.

The authors of the designs include consulting engineers, bridge engineers of state highway departments, structural engineers with governmental departments, designers of steel-fabricating companies, structural engineers of research organizations, and professors of structural engineering. These men are active designers in 17 different countries, including the United States, where they represent 20 states. Their designs incorporate their experiences and recognized ability for creative thinking.

The designs are original for an all-welded 2-lane through-highway bridge with a span of 250 feet. Presented along with each author's discussion of his designs, are the original drawings (over 100) of elevations, sections, and details. The book presents the major features of enough of the program's designs to insure that most of the new useful information developed for the program is included. Division into chapters facilitates comparison between similar features of different designs.

Priced at $2.00 in the United States and $2.50 elsewhere, the book is available from The James F. Lincoln Arc Welding Foundation, Cleveland 17, Ohio.

Anti-Rust Phosphate

Addition of a new anti-rust phosphate to its ice and snow-melting chemical is announced by The Chem Industrial Co., 3784 Ridge Road, Brooklyn 9, Ohio.

The improved Melt formula guards against excessive rust in the de-icing of pipes, railway switches, gutters, and drains, and protects cars, trucks and machinery on loading docks and in driveways and parking lots. It is also said to furnish traction under spinning car or truck wheels. If used at the start of a storm, it will melt snow as it falls until its thawing action is dissipated.

Melt is available in 25-pound steel pails and 100-pound steel drums. Ton lots are packed in 100-pound moisture-proof bags. The pellets have been resized for better thawing.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 283.

Highway-Stripe Marker

A folder on street and highway reflectorized striping has been released by the Cataphote Corp., 958 Wall St., Toledo, Ohio. The pigmented binder described comes with or without premixture of reflector beads.

The premixed type is said to cut application costs and to give extra-deep embedding of beads. Three types of the unmixed variety are available: for highways, for heavy municipal traffic, and for airlines.

This folder may be obtained from the company, or by using the Request Card at page 18. Circle No. 299.

PREHY Construction Equipment
(Weber system)

TYPE "S" GROUTER & PLACER. INDISPENSABLE EQUIPMENT FOR:—
- Plastic and Fluid Pressure Grouting
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Type "S" Grouter

CONCRETE GUN efficiently designed for GUNCON (*gun applied concrete*). For
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- Repairing deteriorated or spalled concrete, fireproofing, etc.
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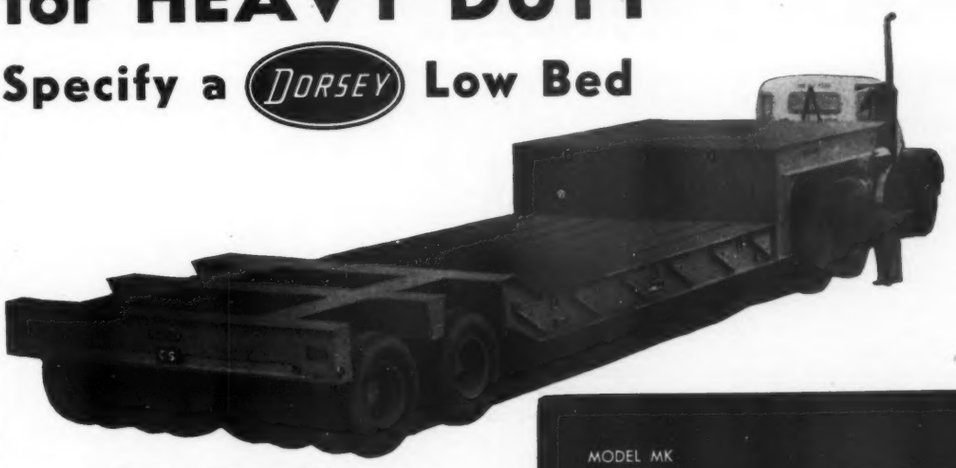
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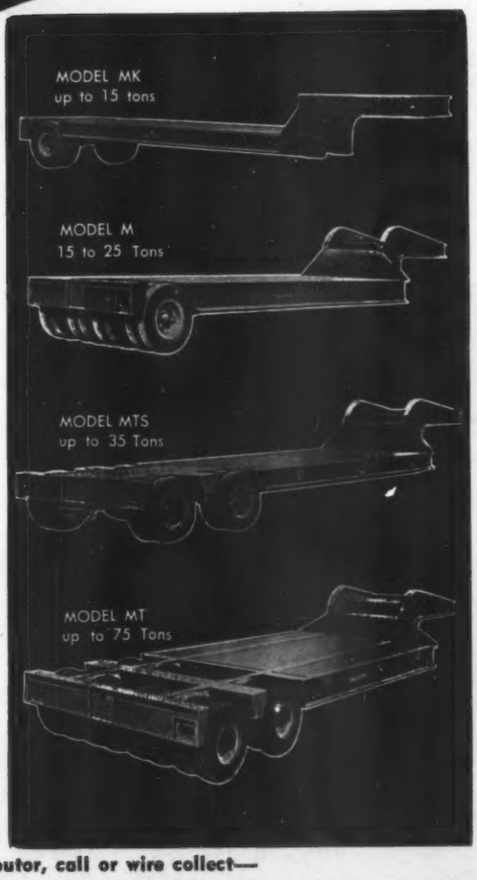

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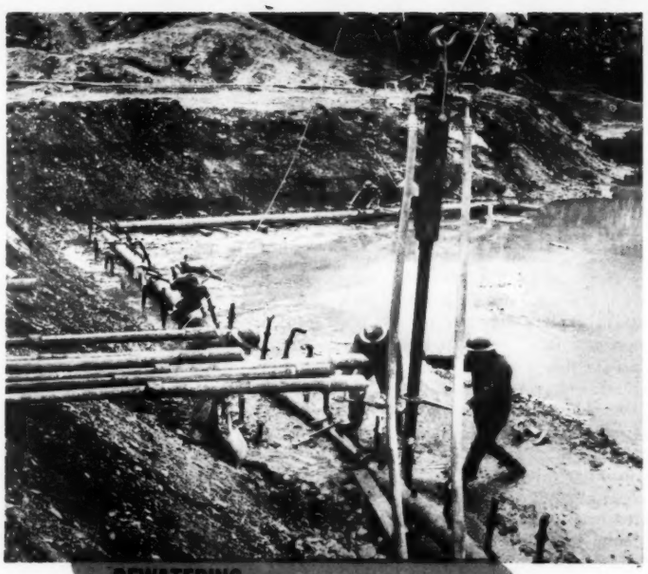
ROAD BUILDING

Tractors about to join 2 sections of powerline access road as one works down to meet the other coming up.



DEWATERING

Well point system permits erection of reinforced concrete intake structure 65 feet below present level of lake.

Nature's Forces Harnessed to Produce

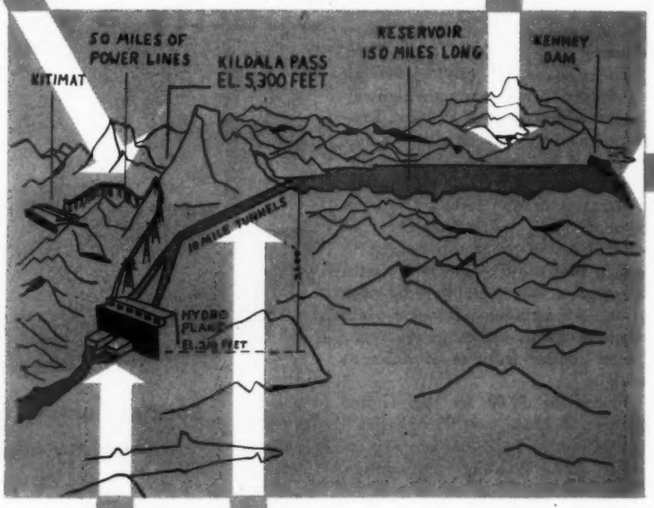
ALUMINUM

• PROJECT BRITISH COLUMBIA is the name given to the construction of an aluminum-production center which may well become the world's greatest. The Aluminum Co. of Canada, Ltd., (Alcan) plans to invest over $500,000,000 in the project before it reaches its ultimate development. It is well under way, and hopes are high that by September, 1954, an annual processing of 183,000,000 pounds of aluminum will be going on at the reduction plant from an initial production of 318,000 kw at Kemano, 50 miles away.

Think of an area the size of Connecticut, and imagine it all wilderness—that will give an idea of the magnitude of this project. Four hundred miles north of Vancouver, Project British Columbia stretches about 175 miles from Kenney Dam on the east to the powerhouse at Kemano and the smelter and town site at Kitimat on the Pacific Coast—with a forbidding range of mountains in between.

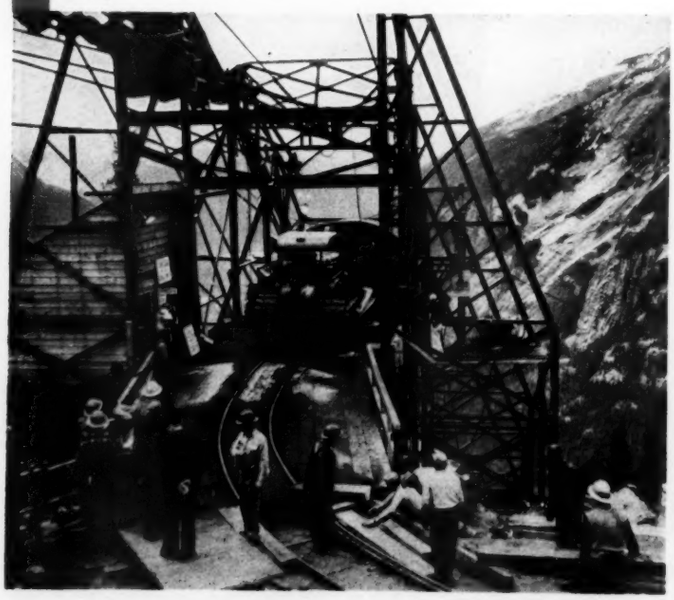
The over-all plan of the project amounts to changing geography so

(Text continued on page 26)



EQUIPMENT TRANSPORT

This giant aerial tramway carries a 9-ton car attached to 2 cables and can lift 60 men or 20 tons of machinery at a trip.



TUNNELING

A hundred miles west of dam, miners enter the 25-foot-diameter tunnel that will carry the water 10 miles from the reservoir through the mountains to the powerhouse.

BLASTING

Big blast breaks the rock wall of the Kenney Dam quarries. Shots here have used from 100 to 200 tons of dynamite, the latter being the largest blast ever fired in Canada.

GUNITING

A stream of Gunite is sprayed on the canyon face forming the western abutment of earth-filled Kenney Dam. Over 450 cubic yards will be used in preparing walls of the Grand Canyon of the Nechako River.

CONCRETING

A cable-carried bucket of concrete is lowered to crews working on the construction of the base for Kenney Dam.

EARTH MOVING

An International TD-24 dozes a big chunk of rock into position to be picked up by Marion shovel and loaded into a Euclid.

Construction Project In British Columbia

(Continued from preceding page)

that nature can be made to work for man. British Columbia's high inland shelf is covered for a great part of the year by deep snows, but these are blocked off from the Pacific Ocean by rugged mountains of the Coast Range. The lakes which receive the melted snow have always drained eastward into the Nechako River. It was realized, however, that if they could be diverted and made to flow through the mountains rimming this high shelf and then dropped ½ mile to the Pacific, both the great height and the tremendous water storage could be converted into energy for making aluminum. Alcan's plan is just that. And the way it is being done is by damming up the water at the point where it gushes through the Grand Canyon of the Nechako, then diverting it through the mountains by tunnel. The various stages of Project British Columbia may be summed as:

1. To build the largest sloping clay-ore dam in the world.
2. To fill a natural reservoir of lakes and rivers, draining an area of 5,000 square miles.
3. To make the water run backward and channel it by a tunnel 10 miles long through a mountain.
4. To drop the water from a height six times as high as Niagara and through one of the largest power plants in the world, constructed inside the mountain.
5. To flash the electricity created in the powerhouse over a 50-mile transmission line crossing mountains, snow field, and glaciers.
6. To power an aluminum smelter 2½ miles long at a brand-new deep-water port and city that may eventually house 50,000 people.

Heading up the entire project for Alcan from offices at Vancouver are: P. E. Radley, Manager, Project British Columbia; J. S. Kendrick, and F. T. Matthias, Assistant Managers; and H. C. Jenkinson, Chief Resident Engineer for all operations.

Access-Road Construction

Since all major development sites are located in wilderness areas, road construction was the first and most important operation during the initial stages of the project, which got under way in February, 1951.

The first road put through in 1951 connects the tidewater anchorage, open all the year round, where ocean-docking facilities are well under way, with Camp 5, the headquarters, and by far the largest camp in the Kemano area. The anchorage is on Gardiner Canal, a 60-mile ocean arm flanked by high mountains. The 10-mile, all-weather, 2-lane gravel road runs along the Kemano River with a 200-foot rise over its length. Its three major bridges are capable of supporting heavy traffic. One of these bridges is a $250,000 steel structure built by the Dominion Bridge Co. Gravel ramps leading into the concrete abutments on which the bridge rests were constructed with easy grades. The whole road required extensive filling and stabilizing, in many places large 100 to 150-foot logs underlying the fill.

Initial work in the construction of Kenney Dam consisted of building and improving a 60-mile access road from Vanderhoof, the railroad for the dam serviced by the Canadian National Railroad. This work began at the same time as the clearing and preparation of the dam site.

An International TD-24 makes its own work bench of waste material removed from the tunnel at a 2,600-foot level. The weight of the rock forces trees away from the mountain-side at a sharp angle.

Climbs a Glacier

By far the most difficult road-building job, however, was an access road leading to the mountain pass over which the 50-mile transmission line is to carry electric power. Six miles in length, this road starts at the switching station on the Kemano River, then leaves the river to climb up Glacier Creek Canyon, a 2,000-foot-high gorge, thence through a high mountain bowl to the 5,300-foot Kildala-Kemano Pass. So hard was the going (seldom less than 15 per cent grade at any point), that it took 6 months to build 4 miles of road. Started in November, 1951,

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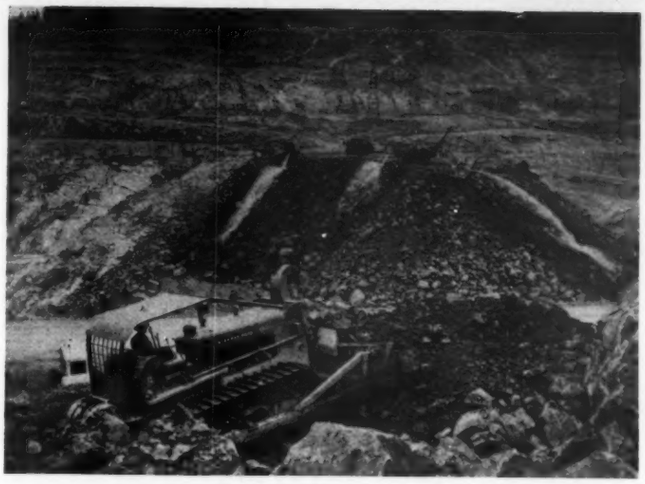
it was finally finished only in the fall of 1952.

Because of the difficulty of pushing this heading up through solid rock, a pioneer operator, in an International TD-24 tractor, was first sent up the snow of Glacier Creek Canyon in an attempt to mark out a road in the steep hard-packed snow reaching to a depth of 150 feet. After a 2-day journey over a snow bowl under which rushed torrents of snow runoff water (the crawler being refueled by a helicopter), the operator reached a spot where Camp 10 was set up. Five more days of repeated efforts brought the crawler to the top, one week after it had taken off. Using the road pioneered by the lead tractor, another TD-24, pulling a winch and a compressor mounted on timber sleds, arrived at a point 800 feet below the pass. With winch help from the first tractor, anchored on top, the second TD-24 made the pass with its equipment the next day, and shortly afterwards another camp—Camp 11—was established on the snow. All materials and supplies for this camp were flown in by helicopter, while the two dozers dozed snow to reach solid rock and pioneered sections of the road out of talus and loose rock.



Tons of loose material are cleaned from the south base of Kenney Dam, third largest clay-core dam in the world. The white lines on the hill in the background indicate canyon-wall areas to be gunited and grouted.

In the meantime, five other tractors were rushed up to the first camp, hauling road-building equipment and supplies. From here they began work down toward the original heading still being blasted slowly up the canyon. These tractors, pulling Athey wagons, brought nearly all supplies and materials into this first snow camp. By the time the snow melted from the open-bowl area above the timber line, most of the road requiring fill, cuts, talus shelf, and benches in weaker rock had been made by the seven tractors working from the top down.

Kenney Dam

The first structure of the whole project was Kenney Dam, begun in February, 1951, at the easternmost part of the area, 175 miles from the Pacific Ocean. Construction on this $20,000,000 job is proceeding rapidly, and completion of the huge clay-ore dam is scheduled for early this year.

Morrison-Knudsen Co. of Canada, Ltd., Vancouver, B. C., is the prime contractor for Kenney Dam, and Mannix, Ltd., also of Vancouver, is a subcontractor. British Columbia International Engineering Co., Ltd., Vancouver, designed the dam, under contract to Alcan; Engineering & Construction Services, Ltd., Edmonton, Alberta, directed and inspected the placement of clay fill.

As soon as the access road from Vanderhoof to the dam site was completed, work got under way. Almost immediately the battle to bring in heavy equipment began. Cranes and draglines were forded across the Nechako at low water upstream of the dam site. A log ferry, pulled by an overhead cable, carried much equipment across the river to the bank opposite the road. Here operations were started for driving a diversion tunnel for re-routing the waters of the Nechako River.

A 2½-yard dragline built a dike across the intake-portal area of the diversion tunnel so that work could progress below the river level. In order to get the heavy machine down the canyon wall, International TD-24's with dozers built a gravel and rock-fill ramp down to the water's edge. Then, anchored by the winch lines of three of the crawlers, the giant dragline lumbered down the steep ramp into the canyon and was pulled out after construction of the dike. The diversion tunnel was completed in August, 1951. This 32-foot tunnel, 1,430 feet long, carries the water of the Nechako River around the construction site. Cofferdams at both feet of the dam protect it from the river.

A reinforced-concrete-slab footing for the impervious clay ore was completed late in May, 1952, and early in the same month rock filling was begun. By the end of June about 15 per cent of the final rock fill had been placed. An average of 17,000 cubic yards per day was

(*Continued on next page*)

and they're UP

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1 Lift inner tube to approximate height desired.
2 Insert Pin in nearest hole.
3 Turn collar handle for final accurate adjustment
1
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3

Construction Project In British Columbia

(Continued from preceding page)

reached, work continuing on two daily 10-hour shifts, 6 days a week.

Kenney Dam will be the largest sloping clay-ore dam in the world. The sloping clay core is supported by rock fill with layers of sand and gravel between rock and clay. The fill rises 317 feet above its narrow base with a great length of 1,550 feet and crest width of 40 feet. Crest elevation is 2,825 feet above sea level. This dam contains approximately 3,825,000 cubic yards of material. Fill material is:

Quarry-grade rock	2,050,000 cubic yards
Filter material, porous sand and gravel	690,000 cubic yards
Pit-run gravel	585,000 cubic yards
Impervious-clay material	500,000 cubic yards

Rock fill comes within 45 feet of the crest on both sides. Underlying the clay core is a reinforced-concrete slab 150 feet long x 82 feet wide.

The Clay Core

Sloping clay-core design meant that the dam could be built with much less rock than would have been necessary with a vertical clay-core design, according to Jim Hayes of British Columbia International Engineering Co. Hayes has technical supervision over the work, including guniting and grouting the entire contact area between the clay core and the canyon walls. According to him, Kenney Dam is the first application of this technique on so large a scale.

More than enough high-grade clay for the impervious core was available about a mile from the construction site. It consists of inorganic glacial till with 4 to 6 per cent moisture. In preparation for loading, it was broken up and boulders removed with a scarifier drawn by a TD-24. Since specifications called for more and carefully controlled moisture, the material was wetted down before loading to give it the right moisture content.

Six to eight 12-yard motor scrapers were used to haul the clay. As more and more fill was needed for each foot of dam rise with the flattening of the canyon walls near the top, 14 motor scrapers were used for clay hauling. Selective loading was practiced to get the right balance of material on each load of clay. Loading runs, therefore, varied in length between 60 and 400 feet. Crawler tractors were used as pushers to speed up loading and send the scrapers off with more material. The scrapers made the 2-mile round trip from the clay pit to the dam in about 10 minutes. The sloping clay core was laid down in 6 to 10-inch lifts. Compaction was done with 16 to 22 passes of a sheepsfoot roller, giving a minimum of 1,000 psi.

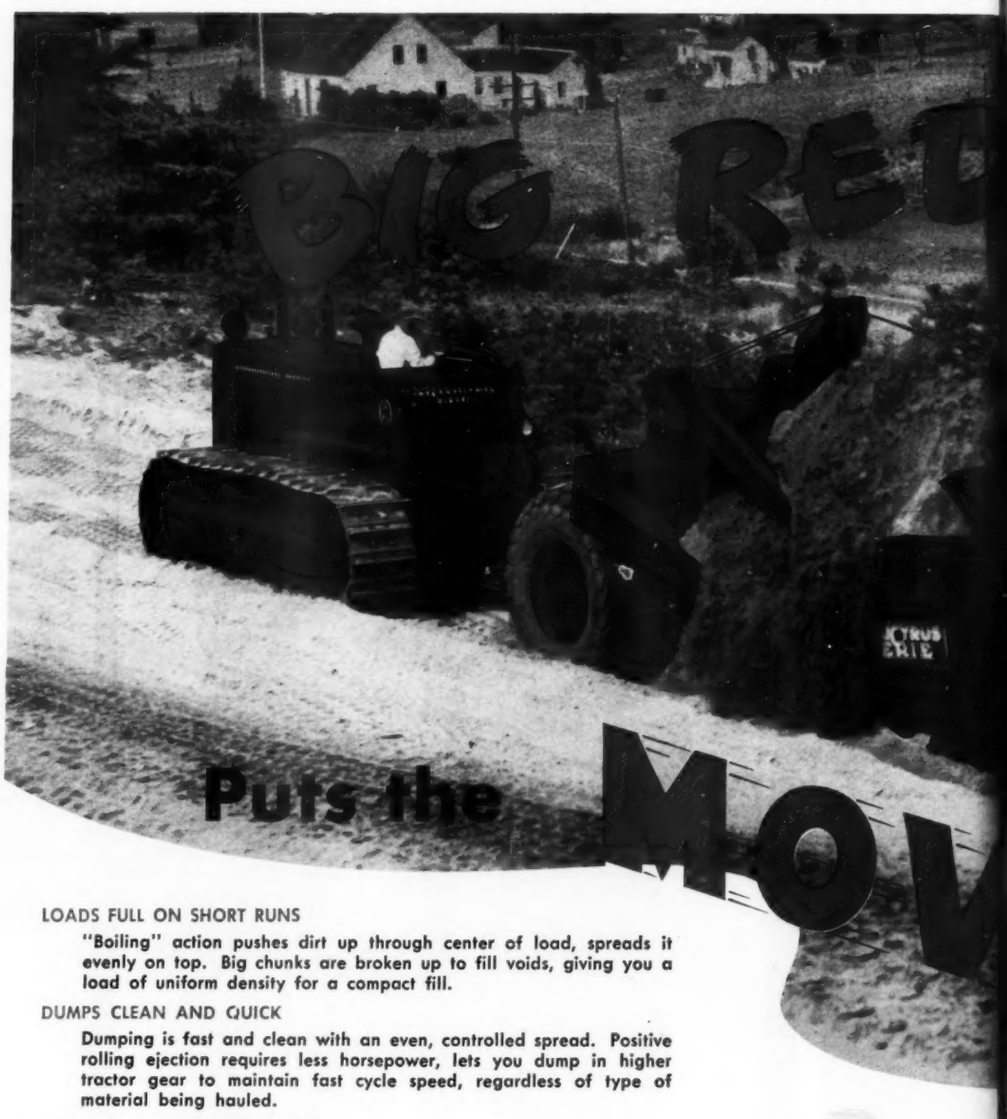
Rock Placement

The bulk of the material in the dam is the 2,050,000 cubic yards of quarry-grade rock. Rock placement, begun in May, was completed before the end of last year.

Three typical coyote-hole blasts were as follows: the first blast, on May 5, used 200 tons of dynamite and was the biggest shot ever made in Canada; the second, on May 25, used 150 tons; the third, June 15, was shot with 175 tons. Forty per cent ammonia slow-velocity dynamite was used in all these blasts, with an average production of 1 cubic yard of rock per 1½ pounds of powder.

With his cargo of needed mining supplies lashed to the frame of the helicopter, this pilot in his globular Plexiglas cabin makes a safe landing.

Sections to be blasted by coyote-hole methods were first stripped of approximately 20 feet of overburden by crawler tractors. Some of this stripping was on such precipitous slopes that tractors working down the overburden were anchored above with winch cables. Blasted material was shovel-loaded into a fleet of 31 Euclid end-dumps of 15 and 22-ton capacity for the 6,000-foot round-trip haul to the dam. These trucks, carrying 9-yard loads, averaged a 12-minute cycle, with one truck dumping about every 45 seconds. Working two 10-hour shifts, the trucks hauled 17,000 cubic yards a day. They operated on a 50-foot divided 4-lane roadway that was constantly watered. As rock was dumped over the side of the fill, it was sluiced down by high-pressure jets of water mounted



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These features — and more — add up to more output per cycle, more cycles in every working shift. See your International Industrial Tractor Distributor soon for the complete story of the dirt-moving features of The Big-Red Team.

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on tractor-driven monitors. Operating at 75 psi, the jets poured out 2 cubic yards of water for every yard of rock. International TD-24's were used in cleaning up around shovels and bunching rock for loading. Six shovels, of the 3½ and 2½-cubic-yard size, did the loading.

A central dispatch tower speeded loading operations in the quarry. Located at the quarry entrance, it had all the shovel numbers painted on its sides. Euclids, returning from dumping, lined up at the tower and were quickly assigned to the first free shovel by placing cards with the truck numbers under the painted number of the free shovels.

Pervious-Gravel Fill

The 690,000 cubic yards of pervious-gravel fill required for the dam was supplied from the many low hills upstream along the river. Samples from several areas were taken, and pits opened. Most of the material was quarried from one pit and screened into the three specified grades—¾-inch; ¾ to 3-inch; and 3 to 10-inch. This material was stockpiled near the dam, then loaded by a TD-14 with an overhead loader and small shovels into light dump trucks, and laid down after a short haul.

The gunited west wall of Kenney Dam is grouted by crews working on platforms staggered up the side of the canyon face. At some points the grout is carried down 125 feet to prevent seepage.

Directing operations for Alcan on the dam site is Harry Jomini, Resident Engineer; Chief Field Engineer is Jim Hayes, of British Columbia International Engineering Co. For Mannix, J. R. Bremner was Project Manager, and "Hak" Nielsen, General Superintendent. A $2,000,000 stock of spare parts and supplies has been kept on hand for all equipment maintenance, including major overhauls, and a card-index system keeps a perpetual inventory of these supplies.

Natural Reservoir

Kenney Dam is due to be topped off and finished early this year, but by the end of last year, when the Nechako River diversion tunnel was plugged, water began to back up on the river at elevation 2,250 feet. It is estimated that the reservoir area will be filled by June 1, 1957, at elevation 2,800 feet. As the area began to fill, work was started on seven or eight small cutoff dikes and dams at low points on the periphery of the reservoir area. An ample freeboard between the peripheral dams and maximum reservoir elevation insures safety. Added safety results from the fact that the lake area is so large compared to the watershed it drains. Beginning in May, 1954, water will be taken from West Tahtsa Lake, at the other end of the drainage area, with a flow of 925 cfs at elevation 2,730 feet.

Diversion-Tunnel Operations

The main tunnel for diverting the water from the reservoirs through the mountains to the powerhouse is 25 feet in diameter and 10 miles long. It is proceeding from four separate points. The opening at West Tahtsa Lake, 110 miles west of Kenney Dam, provides the principal water intake. High in the mountains on the other side of the range (halfway between the West Tahtsa and Kemano headings), crews are drilling in both directions—east to meet the Tahtsa tunnel, and west to meet another crew drilling in from the coast. These drilling crews work from an adit at 2,640 elevation (Horetzky Creek) where there is a camp. About ½ mile is being excavated each month, and the actual meeting of the tunnels will take place within the mountain—pinpointed to the inch.

Because of the pervious nature of the natural ground on the lake side of the intake-structure site, wellpointing has been found preferable to sump-pumping during construction. Consequently the wellpoint unwatering system was adopted to permit erection of the reinforced-concrete intake structure 65 feet below the present level of West Tahtsa Lake. Banks of 15-foot pipe are being sunk by hydraulic jetting for this wellpointing. High-pressure pumps are powered by diesel engines.

To reach the Kemano tunnel heading from Kemano Camp, a giant aerial tramway was installed because construction work for the tunnel was taking place ½ mile above the valley floor. The tramway carries a 9-ton car suspended from two cables and can lift 60 men or 20 tons of machinery at a trip.

Kemano Camp and Powerhouse

The camp at Kemano is the nerve center for most of the operations of the project. Together with its outlying camps, it employs more than 3,000 men, serves some 300,000 meals a month, and carries a payroll that amounts to $1,000,000 a month.

About 1,500 feet inside the mountain is the powerhouse itself—a cavern which will eventually be eight stories high and two city blocks long. Locating the powerhouse inside the mountain protects it against heavy snow and landslides which occur regularly in the valley. It also has the advantage of permitting use of the solid rock to contain the tremendous water pressures that will be developed from the high powerhead, sixteen times

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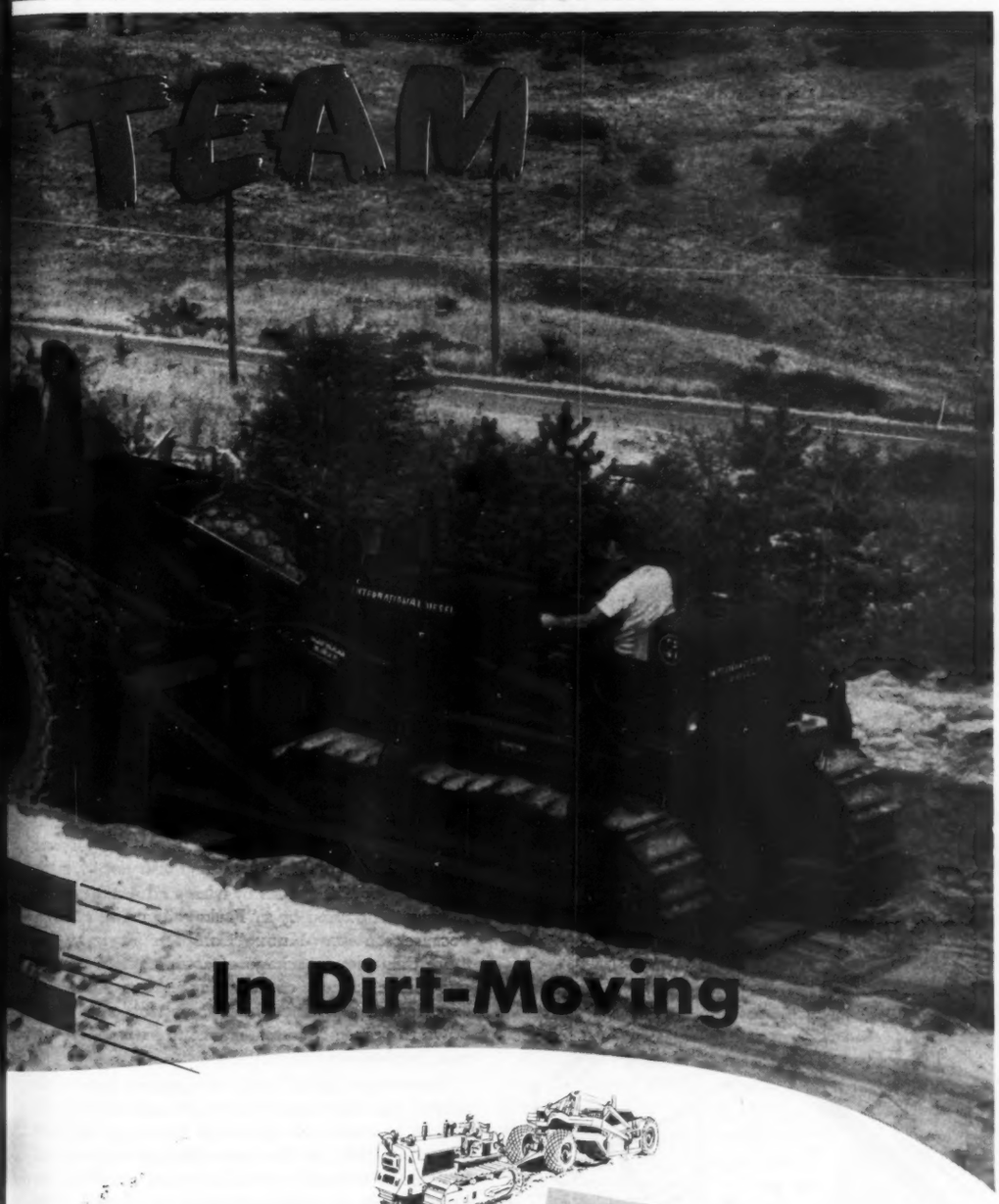

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Up the valley from Kemano, sturdy transmission-line towers dominate the mountainous skyline.

Construction Project In British Columbia

(*Continued from preceding page*)

greater than Niagara Falls. It will contain the main control-room erection bay, and space for eight 140,000-hp turbine-driven generators that rank with the largest ever built, capable of providing power for all the millions of people and thousands of heavy industries in a city like Chicago.

Transmission Line

From Kemano, a transmission line strung with some of the largest cable conductor ever fabricated will carry the power 50 miles across mountainous terrain and over a mile-high pass to the smelter site.

As described above, immense difficulty was encountered in building an access road up Glacier Creek Canyon to the Kildala-Kemano Pass, which the transmission line is to cross. This considerably reduced the time limit on construction of the power line in order to meet the September, 1954, deadline. It is, however, expected to be finished by that time, and generators will be installed at the Kemano cavern in April, 1954.

Right-of-way clearing and tower construction for the transmission line has been proceeding under high pressure in the short construction season permitted by conditions in the storm-clogged pass area. By the end of July, 1952, most of the angle-steel towers had been erected in the 9-mile stretch up the level Kemano River valley to the switching-station site, and all concrete tower footings with their anchor bolts were in by the end of the year. Timber felled with gas-powered portable saws was logged and made into lumber by the Kemano Lumber Co., Ltd., a subcontractor at Camp 5, and used in the construction and expansion of the camp for concrete forms, tunnel supports, ties, and other purposes.

Top Alcan officials at Kemano are: Karl Roestad, Resident Engineer; C. W. Abrahamson, Assistant Resident Engineer; and B. H. Hutton, Office Manager. Morrison-Knudsen personnel directing operations at this site are: A. C. Stransberg, Project Manager; V. A. Roberts, Assistant Manager in direct charge of West Tahtsa and East Tahtsa operations; and R. H. Madsen, Assistant Project Manager at Kemano.

Smelter Site at Kitimat

The aluminum-reduction plant itself, to which all the other operations in this vast project lead, is being constructed on the delta of the Kitimat River at tidewater, on 70 acres of land built out into the bay. The site was chosen because of its open location at the head of Douglas Channel where the land is reasonably level. In addition, construction of a railroad and highway 40 miles north, connecting with main east-west transcontinental routes, had long been considered feasible. Canadian National is building a $10,000,000 railroad connection to Kitimat. If, as is expected, the existence of this large block of power attracts other industry, there is plenty of room for it to spread out in the Kitimat River Valley. Moreover the area is not overshadowed by steep mountains that cut out the winter sun, as at Kemano, where the powerhouse is located. Eventually aluminum production from the Kitimat smelter is expected to reach 500,000 metric tons a year.

Work on the delta area got under way in May, 1952. In preparation for the building of storage sheds, docking facilities, and rail terminal, the area was raised and stabilized by removing some of the soft organic material and replacing it with gravel which had been dredged from the bay to deepen the harbor for shipping. Kitimat Constructors, a joint venture composed of eight British Columbia contractors, held the contract for this part of the work. In all, 1,800,000 cubic yards of material had to be dredged and pumped into place.

From the dredge Townsend, leased to Kitimat Constructors by the British Columbia Bridge & Dredging Co., Ltd., Vancouver, a 24-inch pipeline, pumping 24 hours a day, placed around 12,000 cubic yards of fill each day. The dredge pumps were powered by two 1,800-hp power plants. Existing soft, wet, organic material was removed from under the site of the aluminum-storage shed and replaced with

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firmer material to carry the hydraulic fill and the storage area without settlement. A 2½-yard Lima and a 1¼-yard Link-Belt Speeder were used to remove this material, which was then hauled away by 6 to 10 "Eucs" and dumped in a waste area. Two crawler tractors spread the new fill, which was completed in September.

Acting Resident Engineer of the Kitimat operations for Alcan is William Sparks; Guy Davis is Assistant Resident Engineer. For Kitimat Constructors, H. M. Whiting was Project Manager.

A Great Industrial Center

Project British Columbia is the largest integrated engineering program in history. When it is completed, an uninhabited mountainous wilderness—even now not completely mapped—may become a great industrial center of North America, supporting a city of 50,000 people at Kitimat and opening up the whole underdeveloped heart of central British Columbia.

Folder on Dredge Pump

An illustrated folder on the Durable dredge pump has been released by the Thomas Foundries, Inc., 3800 Tenth Ave., N., Birmingham, Ala. The booklet explains the working characteristics of the major parts. A detailed drawing helps to identify components.

The folder points to the chief feature of the pump, the use of Thomas Ni-Hard, an abrasion-resistant nickel-chrome-iron alloy that is said to make working parts last longer than similar parts of cast iron or manganese steel.

Another feature is a water jacket between the shell liner and the outer casing. This body of water transmits the shock from heavy rock and from rams and blowbacks to the casing, while protecting the liner.

This literature may be obtained from the company, or by using the Request Card at page 18. Circle No. 307.

New Flashing Signal

Warning-lamp and traffic barricades are offered on a rental plan from Light Rental & Supply Co., 1945 Blake Ave., Los Angeles 39, Calif. The Flash-r-Lite is a steel-and-wood barricade incorporating one or more flashing neon lights.

The Flash-r-Lite Model R-1.

The lighting unit consists of case, tube, and lens, hermetically sealed mechanical body, and battery. The company claims that the lights will remain in constant operation from 60 days to several months, depending on the type and size of the unit.

The mechanical unit is about the same size as the battery. It is fitted with a 3 prong plug-in jack. Reflectors of some suitable color, as well as Scotch-liting, are attached to Flash-r-Lite barricades in case a light should fail.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 361.

Sufficiency-Rating Report

"Highway Sufficiency Ratings," a 70-page bulletin, complete with tables and graphs, has been published by the Highway Research Board. It contains nine papers presented at the HRB session on sufficiency ratings, together with an Appendix of Procedures.

The topics covered include: sufficiency ratings as an administrative tool; Arizona's experience with sufficiency ratings; general comments on sufficiency-rating procedures; possible areas of improvement in rating procedures; considerations in rating urban streets; graphical presentation procedures; elementary versus composite ratings; use of sufficiency ratings in long-range planning; and relation of sufficiency ratings, tolerable standards, and priorities.

The book, Bulletin 53, is available from the Highway Research Board, 2101 Constitution Ave., Washington 25, D. C. It is priced at 90 cents per copy.

Cummins Engine Ups Tull

E. D. Tull has been named to the newly created position of Vice President and General Manager of Cummins Engine Co., Inc., Columbus, Ind. He has been with the company since 1928, and during the past year had been named Vice President of Personnel and Plant and elected to the Board of Directors. In his new post, Mr. Tull will be responsible for coordinating the work of the five divisions of the company.

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BLAW-KNOX

Migration by Trailer

By MICHAEL LASH, Jr.

In 1949, winning papers in the American Association of State Highway Officials' first National Essay Contests were read by their authors to the AASHO 35th Annual Meeting in San Antonio, Texas—the awards being free trips to the convention for the winners. In the Student Division, the award went to Michael Lash, Jr., of Yonkers, N. Y., a civil-engineering student at Tufts College, Medford, Mass.

Mr. Lash, after a delay due to military service, has now taken up a highway-training job with the U. S. Bureau of Public Roads on the west coast. He sends us the following description of his journey across the country to enter upon his career of civil engineer.

Each summer when our engineering schools graduate a new group of civil engineers, a certain percentage of these graduates—intrigued by the unfamiliar—set out to take jobs at some distance from their homes. It is therefore safe to assume that some of the oddly and heavily laden cars and utility trailers plodding along our national highways at such times contain embryo engineers, often with families, heading out to some distant place to carve out their beginning in the civil-engineering profession. Thus they begin the strange, sometimes romantic, life of a civil engineer.

My family and I recently found ourselves in such a migration. Although I had been graduated from Tufts College in June, 1950, my recall to active duty with the Marine Corps had delayed my participation in civil engineering. Last September, after my discharge, we began our trek from Connecticut to Mount Rainier National Park in the State of Washington, where I was to resume my duties as a highway-engineer trainee with the U. S. Bureau of Public Roads. I had worked for the BPR for three months prior to my recall.

Now offhand this might seem like a rather routine happening, but to the family involved it is usually a world-shaking event. The family in this case, I should mention, consisted of Janet, my wife, David, our little boy of 5 months, and myself. A venture such as this poses many problems of varying proportions. One of the biggest, in our case, was the matter of transporting our possessions to the west coast. The cost of commercial shipping was prohibitive, particularly since we expected transfers to different jobs. There seemed to be only one solution: to build a utility trailer and pull our possessions behind us. Having anticipated this problem months before, I began building the trailer in my spare time while still in the service, and managed to complete it just before my discharge. It was 4 x 7 feet in size, and was designed for a capacity of 1,000 pounds. When finished, it appropriately resembled a covered wagon of the old west.

We expected to be on the road for at least 10 days. During this time we would be doing a heap of living in the small confines of our car, even though we planned to stay at motels overnight. To avoid complete disorder and confusion, we put our heads together and worked out a comprehensive plan for our trip defining each of our separate duties in great detail. To Janet, because of her intrinsic fitness for the job, fell all the duties connected with the baby. To me, the following chores: chauffeur and senior mechanic for car and trailer (I immediately stocked up on friction tape and bailing wire); expedition chef (canned pork and beans are my strong suit); dishwasher; and chief Indian fighter. Next, we painstakingly sketched out the arrangement of all the items which we wanted close at hand in the car. David and his crib mattress occupied the back seat almost entirely, so we didn't have much left to work with. We had station-wagon ideas, but only a small coupe. We utilized every nook and cranny; I even made some drawers to fit under the front seats and Janet made an efficient container for the baby items out of an old fiber box from the attic. This we placed up front, on the floor between us.

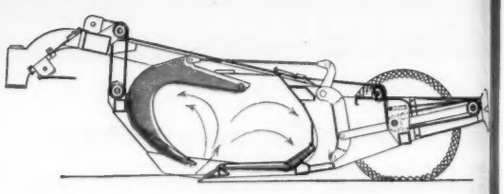
Finally the time came for our departure. The trailer bulged with its load as our ever-faithful car set itself for the weary job which lay ahead. Waving a last goodbye to our families, we began to pick up speed. Soon we were breezing along the highway; the bright morning sun sparkled through the still green Connecticut trees, and the brisk September air urged us onward.

It wasn't long before we reached the George Washington Bridge, and then the handsome New Jersey Turnpike. We seemed to glide along the wide smooth path it made for us through busy cities and desolate swamps. Then onto the Pennsylvania Turnpike, up its easy grades, and through the magnificent tunnels which penetrated once-invincible mountains. In less than two days

Before you buy any earthmover...

LOOK AT THE 195

FAST LOADING
with power to spare



Fast loading is just one of the economy features that keeps Heiliners out in front at earning more profit for earthmovers. The correct pitch and location of the offset cutting edge sets up a "boiling" fountain of dirt *in the center of the bowl*, quickly heaping both front and back with evenly balanced pay-load. Think of the time saved in filling clear to the back of the bowl in just a short digging distance!

In the Heiliner, more than 65% of the overall weight is over the tractor drive wheels . . . the power of the engine is utilized to best advantage. Mechanical down-pressure on the scraper blade cuts even into hard pan easily. In tough going, the entire weight of the scraper bowl rests on the cutting edge. The Heiliner is a rig that really puts its back into loading!

Big tires that really dig in and pull, or practically float the load over soft ground . . . exclusive Hydro-Steer that handles with passenger car ease . . . simple controls and easy turning, are other Heiliner features that cut valuable seconds off loading time . . . help you load and get away *fast*.

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we had crossed the Appalachian Mountains and were rolling along the gentle hills of Ohio. All around us we heard the mighty song of America. It came from the great cornfields that covered the rich fertile plains; from the smoke billowing upward from sprawling industrial plants; it came, too, from the red cheeks and bright shining eyes of farm children as they waited beside the road for the school bus in the early morning.

The gentle rolling motion of the car kept David quietly and happily asleep during most of the trip. We envied his plush accommodations. Up front we were hemmed in on all sides by the paraphernalia of a family that travels with a baby. When we stopped and opened a door, filling-station attendants gaped incredulously. At about 6 o'clock each evening we called it a day and stopped at the next recommended motel. After registering I parked the car and trailer as close to our motel unit as was possible. Then followed an exhibition worthy of study by the most eminent of time-study experts. As soon as the ignition was turned off we both sprang into action. Janet took the baby inside; I followed close behind with his suitcase and portable bathtub. While Janet prepared his bath and arranged a bed for him, I completed unloading the car, and then immediately switched hats and began setting up our field kitchen (motel-adapted). Usually by the time David was tucked into bed, an exquisite hot dinner would be on the table, not counting the night I mistakenly opened a can of vegetable soup instead of baked beans.

On the seventh day we approached Wyoming and the mighty American Rockies. As the great shining ribbon of road worked its way among the huge sprawling mountains, our thoughts went back to the early American settlers. How those early Americans ever managed to work their way through that part of the country is a matter for enduring wonder. Without a firsthand view of the terrain of the West, it seemed to us, no one can fully appreciate the hardship, struggle, and stamina of the pioneer.

On the eleventh day we finally reached our destination at Mount Rainier National Park. We found quarters in an attractive motel, and the next day I began my work as a transit man with a surveying crew. After a few days of searching we found a suitable place to live. Our expedition was completed; we had reached our objective without mishap.

Perhaps nothing is more inspiring to a highway engineer at the beginning of his career than a trip across country on our highways. To ride along for hundreds of miles through green fertile fields, through brown arid prairies, around cities, through mountains, and over bottomless canyons, is to appreciate what mighty things our American highways are. It makes a fellow want to get out and build more of them.

Rivet Prongs Expand To Fasten on Masonry

Fastenings to cinder block, brick, and cement as well as wood, metal laminated over insulation, and most masonry materials, can be made with a hammer-driven blind rivet. Eliminating complicated expansion bolts and inserts, Southco drive rivets are inserted in a ¼-inch-diameter hole and as a protruding pin in the head is hammered flush it expands the rivet prongs inside the wall and fastening is complete, according to the manufacturer.

The rivets are said to save time and labor in attaching BX cable, pipe, conduit, and fixtures to wall material, and are made to fasten metal siding to steel angle framing, and enamel facing plates to cinder-block construction.

Further information may be secured from Southco Division, South Chester Corp., Lester, Pa. Or use the Request Card at page 18. Circle No. 324.

Oil Heat-Transfer Unit

A bulletin on the new Peak-Temp oil booster has been issued by the Road Machinery Division, Cleaver-Brooks Co., 326 E. Keefe Ave., Milwaukee 12, Wis. Illustrations show the unit heating oil, bituminous, and heavy viscous material. It is fired by a low-pressure atomizing-type oil burner and operates with heat-transfer oil up to and in excess of 600 degrees F with no special fittings.

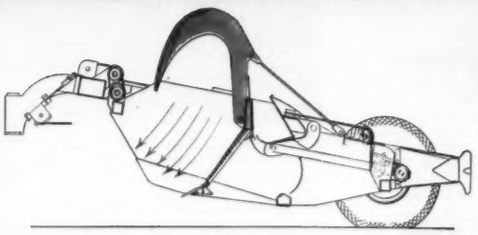
Quicker heating, lower costs, and elimination of weather problems are listed as advantages of the oil-circulating unit.

This literature may be obtained from the company, or by using the Request Card at page 18. Circle No. 287.

District Manager for DeWalt

Douglas B. Beath has been appointed District Manager for the Des Moines—Kansas City trading area of DeWalt, Inc., Lancaster, Pa., manufacturer of power-cutting tools for the wood and metal-working industries. The company is a subsidiary of American Machine & Foundry Co.

HEILINER



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Easy, fingertip operation of the patented double drum power control unit assures split-second control of scraper blade, ejector and apron. Easy-to-reach hand levers can be adjusted vertically and radially to suit the operator's convenience and speed his work.

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R-1

Tunnel Concrete Consolidated by

New Vibration Method

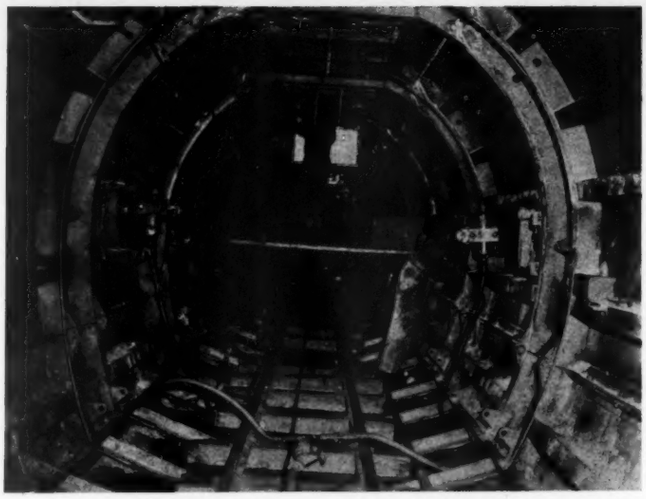
New external vibration methods were used to move and consolidate pneumatically-placed concrete on the recently completed Duchesne Tunnel in Utah.

The 6-mile-long horseshoe-shaped bore under 10,500-foot high Broadhead Mountain linked the Colorado River Basin with the Salt Lake Valley for water-diversion purposes. A Bureau of Reclamation project, the tunnel can handle a flow of 600 cfs. It is 9½ feet high.

Grafe-Callahan Construction Co. and Rhoades Bros. & Shofner, a joint-venture firm from Los Angeles, held the $6,500,000 contract.

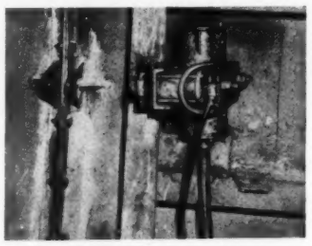
Concrete was mixed in the tunnel and placed pneumatically using the standard advancing-slope method. Viber internal electrical vibrators with 2⅛-inch heads were used through the spring-line doors to consolidate and vibrate the concrete immediately above the invert construction joint. These vibrators were used on the advancing-slope concrete until it reached the bottom of the door opening. The doors were then closed and the external vibrators took over.

The external vibrators were fastened to the form ribs with Viber's new air clamp slightly above the spring-line elevation. They were moved forward in 8-foot increments and were usually kept well below the concrete flow line. As this was a free-flow tunnel without the requirements for arch grouting, and because of the effectiveness of the external vibrators, no special vibration in the very top of the form had been considered necessary. The vibrations were said to travel throughout the length of the slope (20 to 25 feet) except perhaps near the toe next to the invert construction joint.



A general view of the vibrator arrangement, with two external air vibrators on the form ribs and two internal electric vibrators used through the inspection windows in the form.

External vibrators mounted one on each side were operated while the concrete was being discharged. This occurred every 2 or 3 minutes and lasted for about 30 to 40 seconds. If the amount of overbreak was small and the section tight for normal 11-inch thickness of concrete, the vibrators were operated for slightly longer periods of time.



An external air vibrator, equipped with an air ram clamp, in operating position on the form rib.

A third external vibrator mounted on the 8-inch discharge line near the upper elbow was used to prevent line plugging. Air pressures in the tunnel were held near 110 pounds. The contractor rigged up a system of vibrators and vibrator clamps so that one man could move and set up a vibrator in a short period of time.

B. A. Peters was Project Manager on the job and R. C. Blasongame, Superintendent.

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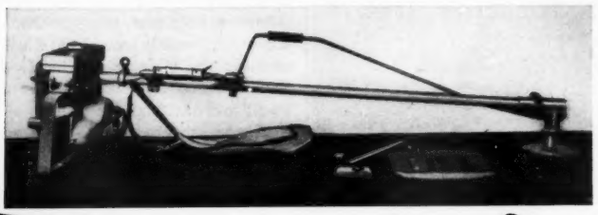

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"Electronic Brain" for Stress-Analysis Research

Bridge and building research involving mathematics too complicated and time-consuming for any human being to finish during his lifetime will be undertaken with the new University of Illinois computer, or "electronic brain." The machine has already been used to begin a study of the effect of moving loads on a bridge, a problem which it has never been possible to analyze so thoroughly. A future endeavor will be a study of how stresses concentrate around rivet or bolt holes, notches, and joints.

The computer can accomplish in a few minutes mathematics that take a man a week, working 24 hours a day. For structures, it is important to analyze the effects of earthquakes and explosions of such magnitudes as the atomic and hydrogen bombs. Designs are based on such mathmatics, but until now only approximations could be attempted.

Illinois is the only university to own an electronic computer available full-time for university research. Prof. N. M. Newmark, head of the Structural Research Laboratory, is chairman of the group which planned and constructed the computer and is in charge of its operation. He, himself, is looking forward to redoing a job which once took a group under his direction three years to complete—a study of bridges which cross openings diagonally. The original findings showed how to make bridges 10 to 20 per cent stronger with no more material. Prof. Newmark thinks that refinements from redoing the job on the electronic brain may give data equally important.

Remember—Safety Is No Accident!

Part of the $2,000,000 Main Street-Humboldt Parkway underpass job in Buffalo, N. Y., includes building rubble stone walls. Here a 15-ton Lorain Moto-Crane, Model MC-254-W, hoists materials to stonemasons. Burner Asphalt & Construction Co., Buffalo, N. Y., has the contract for the highway grade-elimination project.

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S.DAK.—Empire Equipment Co., 828 North Main Avenue, Sioux Falls—Phone: 4-5881; Empire Equipment Co., 602 Maple Avenue, Rapid City; Empire Equipment Co., 823 - 3rd Ave., S. E. Aberdeen.
TENN.—*Choctaw, Inc., P. O. Box 2857, Memphis 2—Phone: 48-4481; Osborne Equipment Co., Market at Front Street, Knoxville 4—Phone: 5-1177.
TEXAS—Boehek Engineering Co., Inc., Box 12187, Houston 17—Phone: OL-4331; G. A. Coffey Co., 826 Slocum Street, Dallas; Hi-Way Machinery Co., 3402 Roosevelt (Hwy. 281 So.), San Antonio—Phone: Walnut 2-7302; *F. B. Howard, Box 3109, Beaumont—Phone: 4-2042; Miller-Ward Machinery Co., 220 North Glenwood, Tyler—Phone: 40641; Tri-State Equipment Co., 500 East Overland, El Paso—Phone: 2-2684.
UTAH—*Western Machinery Co., 2300 S. Main St., Salt Lake City—Phone: 4-7826.
VT.—*Hill-Martin Corp., 411 North Main Street, Barre—Phone: 384.
VA.—Bemiss Equipment Corp., 2219 Chamberlayne Avenue, Richmond 22—Phone: 6-1501; Bemiss Equipment Corp., 224 West Fourth Street, Salem.
WASH.—Jack Sahlberg Equipment Co., 300 Aurora Avenue, Seattle 9—Phone: Mutual 2836.
W.VA.—Allied Equipment Co., 919 Virginia St., E., Charleston 30—Phone: 8-2331.
WIS.—Helo-Pave, Inc., 1915 Parmenter Street, Middleton; D. L. Herr Culvert Co., Corner Coon and Shephard Sts., Rhinelander; Miller, Bradford and Risberg, Inc., 1330 Menomonie Street, Eau Claire—Phone: 2-5443; Stone Manufacturing Co., 321 North 25th Street, Milwaukee 3—Phone: Div. 2-3420.
WYOMING—Studer Tractor and Equipment Company, East Yellowstone Hwy., Casper—Phone: 4500.

* agricultural dealers

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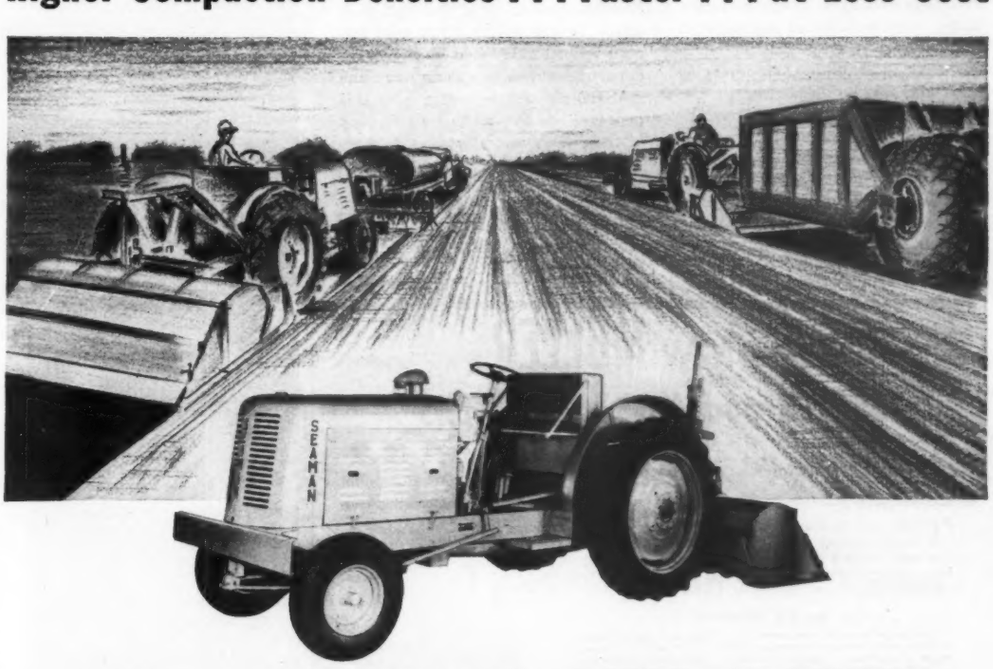

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Processing time for higher compaction cut by 400 per cent . . . Cost reduced by 500 per cent . . . $175,000 saved on one compaction job. These are examples of results achieved by the SEAMAN PULVI-MIXER on earth dams and fills throughout the world.

How are such records possible? They represent savings in time, equipment, labor—eliminating many extra passes with scarifier, disc and rollers—plus vast improvement in densities. On one job, repeated harrowing and *20* passes with an unusually heavy roller failed to achieve more than an inadequate 92% density. After only one passage with a SEAMAN, then rolling out, the specified density of 95% was exceeded. The actual was 98.5% instead.

Why? Because with the SEAMAN you get a perfect *blend* of coarse and fine materials. Voids are eliminated. It's a uniform mix that compacts to higher densities—*much faster!*

Find out now how a SEAMAN PULVI-MIXER can help you to faster, better compaction at lower cost. Write for the complete story, "Better Support for Pavements . . . Better Stabilities for Earthwork." Ask for Folder 55.

SEAMAN MOTORS, INC.

282 N. 25th ST. **MILWAUKEE 3, WISCONSIN**

Use of Radio Helps Highway Department

Radiotelephones Are Popular Tool for Everyday Highway Maintenance and Effective Public Relations

• IN recent years, with the annual amount of travel close to half a trillion vehicle-miles, there has been an increasing demand for greater traffic service. Radiotelephones are a means of improving this service, said H. A. Radzikowski, Chief of the Maintenance Branch of the Bureau of Public Roads, in an address last fall before the annual meeting of the Southeastern Association of State Highway Officials. Speaking in his capacity as Secretary of the Committee on the Use of Radio in Highway Departments, Mr. Radzikowski stated that never during his experience on this AASHO committee has any highway department indicated regret over its investment in radio communication facilities.

Growth in Use of Radio

When radio communication was first proposed as a means of facilitating maintenance and operation, it was envisioned as an instrument to be used in handling emergencies only, and was so authorized by the Federal Communications Commission. In 1949, however, under pressure from representative groups of the highway industry, the FCC established a Highway Maintenance Class of service and made available 14 clear channels and a number of others on a shared basis for use by highway departments. With this assurance of undisturbed possession and encouragement by the removal of restrictions, highway departments quickly took advantage of the opportunity to make their limited funds do more work through the increased efficiency possible with radio control of operations.

The growth in the use of highway radios has been characterized not only by a large number of new users each year, but also by the rapid expansion of radio coverage in those states which originally had installed radio on a small-scale basis. There has been an ever-increasing list of new applications to facilitate nearly every phase of the work performed by highway departments, and today over 100 highway departments are using radiotelephones, with services covering one-third of the land area of the United States. Each year annual reports submitted by highway-department radio users to the AASHO committee relate how this new tool has increased the efficiency of their highway efforts.

Everyday Maintenance

Aside from snow and ice control in winter maintenance operations, there have been many other applications, equally effective, of this medium. The use of radio in performing everyday maintenance on the New Jersey Turnpike and other road systems provokes the imagination.

The extent to which maintenance operations have been mechanized in the past few years offers great possibilities of more effective maintenance effort, but only if management is able to utilize each equipment unit efficiently in the performance of useful work. Highway departments equipped with radio have found that one of its major benefits lies in the management of their equipment fleets. In the case of breakdown of equipment, foremen need not do a lot of driving to find a telephone, but are in a position to obtain information when they need it, or ask for more men, materials, or equipment, all in a matter of minutes.

Also when maintenance operations are spread out over a large area, operating efficiency is not the best. Two-way radio communication permits a tightening of the organizational control and reduces transportation time.

The radio, besides saving travel time and mileage for supervisory employees and causing a better utilization of equipment, thereby reducing the number of units needed, gives a better timing of labor, material, and equipment services. This lowers production costs and results in a general speedup of all operations.

Radio is now being used for area conferences on mutual highway-maintenance problems and to keep up with available inventories. For example, in Alaska, at a designated time, all of the districts switch on their radiotelephones for a general discussion of the road problems of

These NEW MULLER PLASTER and MORTAR MIXERS "have everything"!

These new Muller Mixers, with new money-saving features, live up to the well known Muller tradition for high quality with low price and low upkeep cost.

All sizes now have the Muller Paddle Shaft Seal (Pat. Pdg.) for positive bearing protection, guaranteed for the life of the mixer!

THE 3½' MODEL→

A new larger drum for light materials . . . choice of electric motor or either of the two best air-cooled engines, large enough to stand plenty of overload . . . power throw-out . . . hinged engine housing . . . self-lubricating, self-aligning bearings . . . ball thrust on paddle shaft . . . new safety grid.

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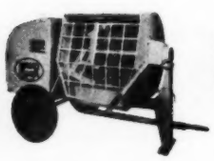
1 H.P. Electric Motor	$312.00
2.7 H.P. Briggs & Stratton Engine	330.00
3.1 H.P. Wisconsin Engine	360.00



←THE 6' MODEL

Large heavy duty drum . . . double V belt drive from engine to countershaft with simple power throw-out (on gasoline models), avoiding all need for clutch adjustments . . . drive from countershaft to paddle shaft through machine cut gears . . . narrow trucks optional for indoor use.

PRICES F.O.B. FACTORY

3 H.P. Electric Motor 220/440 3 Ph.	$580.00
4.6 H.P. Wisconsin Engine	530.00
7.7 H.P. Briggs & Stratton Engine	540.00

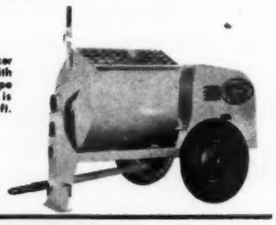
THE 6' TO 8' HEAVY DUTY MODEL→

The size for large jobs requiring extra capacity, or where mixer encounters extra severe service . . . regularly equipped with 7 H.P. Wisconsin Air-Cooled Engine with built-in disc type clutch running in oil . . . drive from engine to countershaft is heavy duty roller chain and machine cut gears to paddle shaft.

PRICES F.O.B. FACTORY

7 H.P. Wisconsin Engine	$650.00
5 H.P. Electric Motor 220/440 V	680.00

(Standard 9 Cubic Foot 3 Bagger also available)



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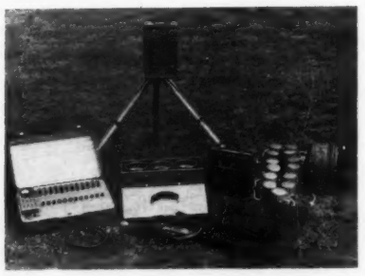
With Midwestern Refraction Seismograph Equipment bedrock location is easy and economical because one surface shot will give the same information as several drilled sample holes. This Midwestern Portable Equipment is designed and manufactured to the highest engineering standards to give the long trouble-free service and accurate information demanded by competent engineers. This unit is comprised of rugged, dependable, precision instruments which will give true records of subsurface conditions. It will save many expensive hours of time when compared with other methods of bedrock location. For complete information write or wire.

Midwestern Portable Seismograph Equipment is the same in its field as your finest alidade is among surveying instruments. Every instrument is constructed to give the service and high degree of accuracy necessary to meet engineering standards.



MIDWESTERN GEOPHYSICAL LABORATORY

MIDWESTERN GEOPHYSICAL LABORATORY

3401 S. HARVARD TULSA, OKLAHOMA

the day. In this way the conversation may settle a problem in a matter of minutes that might otherwise take many days.

Public Relations

Radio is not only a good morale builder in that foremen feel like a part of top organization, but also is effective in creating good will with the highway users who pay the bill, said Mr. Radzikowski.

Radiotelephones provide better traffic services to the owners of the 53,000,000 registered motor vehicles. In order to take advantage of all sources of information and with a view to reporting without delay road conditions and emergencies as they arise on the highways, many of the highway departments have exchanged radio facilities with state police. In this way, cases of fallen trees blocking highways or construction and detour changes can be reported and rebroadcast over commercial networks for the road user. Forewarning of a storm, too, is as important as subsequent reports of damage. Owners of district maintenanee shops, for instance, are thus given time to get their equipment under cover.

In metropolitan areas which carry high volumes of traffic, a storm or accident can blockade everything quickly. Right now a plan is being considered to link together such highway departments by common radio frequency so that traffic would permit the exchange of road information and other data of mutual benefit to these highway departments.

Here's a typical example of good public relations through the use of radiotelephones. A county engineer who used radio in the control of mechanized maintenance operations, was phoned one day by the owner of a lumber yard who complained that there was a large mud hole in front of his office, with the result that customers could not come in and his trucks could not move out without getting stuck. The engineer told the man to hold the line while he checked the records, though in reality he phoned his foreman by radiotelephone and told him to go to the yard. The conversation was resumed for about ten minutes—by which time the foreman had reached the office and inquired about the complaint. The mill owner returned to the phone and apologized profusely, stating that he had no idea the highway department was such an efficient organization and gave assurance that the county engineer would have his support from then on.

Costs

The costs of radio vary with the individual highway departments. One charges 11 cents per hour rental while equipment is in operation; another, $7 per unit per month for the same service. Still a third charges $25 per unit per month including all depreciation, repair, and operating service. One county has figured out that on the basis of population it costs 8 cents per person per year to insure prompt road assistance in case of emergencies. Generally a base station costs about $2,000; mobile units cost about $600 and $700 depending on the type of service required.

Recently there has been the sharing of radio receiving and sending equipment by a number of mobile units. Each piece of road equipment is equipped with a rack for receiving the radio unit with connections for easy removal of the radio sending and receiving set. As a piece of road equipment is taken out of use,

(Concluded on next page)

Setting up Outside Form of Battered Wall, James Leck, Minneapolis, General Contractor

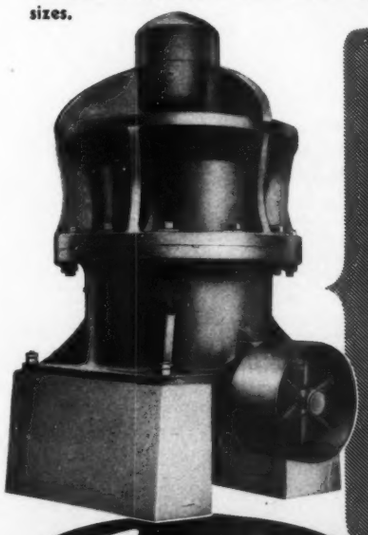
Symons Forms for Battered Walls

Battered walls are constructed similar to vertical walls, the only difference being a variation in tie lengths. Ties are placed when inside form is erected . . . outside wall is locked to ties with the same connecting bolts and wedges that bind panels together.

Send plans for your next job and get complete layout and cost sheet—no obligation. Symons Clamp & Mfg. Co. 4251-A-3 Diversey Avenue, Chicago 39, Illinois.

The bigger the job... the more important it is to control your aggregate supply

In the construction business, it pays to have complete control of as many of your supplies as possible. When you produce aggregate on the job, you're taking one more step towards greater efficiency . . . and greater profits. Especially when your crusher is a Traylor TY. That's because the Traylor TY is a machine of many exclusive features, designed to produce uniform cubical aggregate in a wide range of sizes.



These Traylor TY features will insure a steady supply of aggregate

1. An all cast steel frame, with the upper shell and spider made in one piece.
2. Traylor original, self-tightening Bell Head and Curved Concaves, made of manganese steel.
3. Traylor Dust Seal, practical and efficient for excluding dust and grit from the lubrication chamber.
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6. Self-contained countershaft bearing, fitted with roller bearings and automatically lubricated.
7. An all-around bottom discharge, without diaphragm.

All these features are illustrated and fully described in Bulletin 7112. To see how you can get better aggregate . . . as you need it . . . send for your copy today.

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MOUNTED ON WHEELBARROW CHASSIS
Write for details and prices
ROETH VIBRATOR CO
1737 Farragut Ave., Chicago 40, Ill.

The Use of Radio Helps Highways

(Continued from preceding page)

the radio is readily switched to other road equipment. This has increased the economy in communication service.

In one case a loader broke down on a job where the men and equipment were costing the county $478.50 a day. The commissioner, when he found the loader would have to be sent away for repairs, thus stopping the entire job, phoned a foreman on a nearby project and asked him if he needed men and equipment. The foreman did, and the materials and crews were switched to that job with no money loss to the county. It would take only a few such incidents to more than repay the cost of the county's radio facilities.

Mr. Radzikowski concluded that the use of the highway radio saves time, mileage, and equipment; is an effective public-relations instrument; and in general answers the growing demands for improved highway-transportation service. Furthermore, due consideration should be given to the additional protection of life and property as a result of the prompt handling of emergencies through radio communication.

Side Dozer Cleans Under Guardrails

A new side dozer for scalping berms and shoulders under guardrails is announced by Huber Mfg. Co., 202 N. Greenwood St., Marion, Ohio. The job has been done by hand operations up to now.

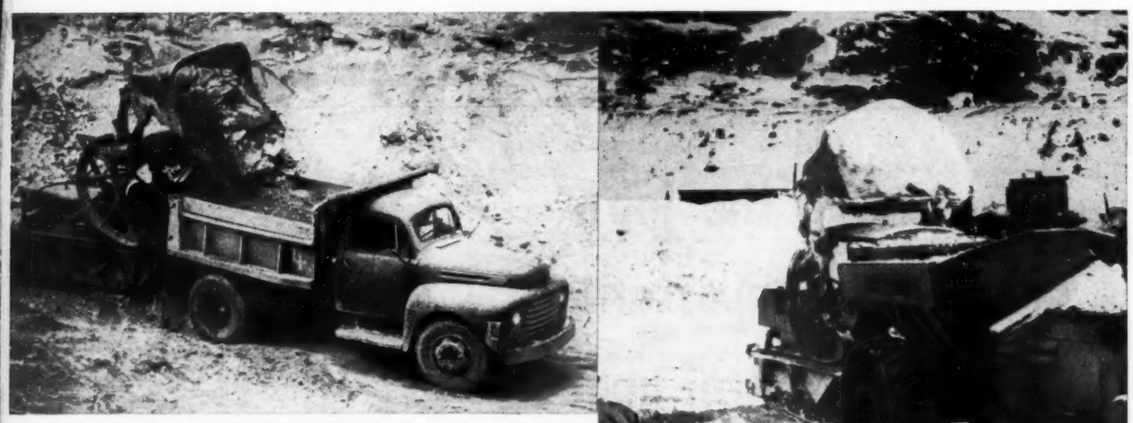
The side dozer is hydraulically powered for removing sod, gravel, and other accumulated debris under railings. It is mounted on the blade-suspension system of any existing Huber maintainer. The cutting blade is made of high-carbon steel, is 48 inches long, 6 inches high, and ½ inch thick, and scrapes under any guardrail, clearing the ground by 6 inches. Maximum reach of the side dozer is 72 inches, and it weighs approximately 520 pounds. The over-all width of the maintainer with side dozer in retracted position is 96 inches.

The new Huber side dozer scalps berms under guardrail.

The size dozer is the tenth attachment for the maintainer, which is basically a road-maintenance machine with standard blade. Other attachments include: bulldozer, lift loader, berm leveler, road planer, highway mower, patch roller, broom, and one-way and two-way snow plows.

The side dozer in retracted position.

Further information may be secured from the company by requesting Bulletin No. M-155. Or use the Request Card at page 18. Circle No. 305.



LOAD SAND, SNOW, ROCK OR SILT WITH EIMCOS

The Eimco 104 is a heavy-duty machine for handling materials such as rock, sand, gravel or snow. Use it for digging basements, ditches or building roads. For loading trucks in tunnels, quarries or sand and gravel pits.

The Eimco moves forward to load and back to discharge. This straight line movement speeds up the job and reduces maintenance costs.

The Eimco is an ideal tool for heavy-duty loading jobs.

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Truck Transmission Now Fully Automatic

The 1953 line of Ford light trucks and pickups will be equipped with fully automatic transmissions as optional equipment with either the Ford V-8 or the 6-cylinder engines.

According to the manufacturer, the new transmission gives ease of driving, reduces operator fatigue, and the same economy as conventional drive. Light trucks equipped with this transmission are said to have been tested over more than 250,000 miles of highways and on engineering dynamometers an equivalent number of miles.

For off-highway hauling a transmission cooler of the oil-water heat-exchanger type has been added. The water comes from the engine-cooling system. Parts are interchangeable with other Fordomatic transmissions, the company claims.

Further information may be secured from the Ford Motor Co., P. O. Box 638, Dearborn, Mich. Or use the Request Card at page 18. Circle No. 314.

"So you want a raise, eh?"

Drills Cut Job Cost

Replacing the section of winding two-lane U. S. 62 between Youngstown, Ohio, and Sharon, Pa., is a new four-lane superhighway that makes the old route look like a pioneer's wagon trail in comparison.

The prime contractor, D. R. Smalley & Sons, Inc., Celina, Ohio, is in charge of construction, while the subcontractor, Apex Powder Corp., Canton, Ohio, is responsible for the blasting operations. The $1,800,000 project, covering a 5-mile stretch, cuts through two areas of concentrated sandrock.

These three McCarthy vertical drills helped cut costs on the U. S. 62 job.

The two-lane east and west roads, separated by a 40-foot median, are each 24 feet wide. The total width, including berm, is 120 feet. Maximum gradient runs 4 per cent; maximum curve allowance, 3 per cent. It is estimated that the job will be completed about January, 1954.

Three McCarthy vertical drills operated by the Apex Powder Corp. are playing an important part. By drilling about 150 holes for each blasting pattern at depths averaging 15 feet, and with centers of 7 feet, approximately 3,000 cubic yards of sandrock and earth are split into small loose lumps each time the explosives are discharged. The fixed-type explosives, detonated by Rockmaster Caps with fast delay, while eliminating excessive throw, vibration, and noise, create thorough fragmentation of stone and earth structure. Earth concussion carries no further than 120 feet, and the use of small shots means that the throw of loose debris only extends about 15 feet. As an instance of this, no disturbance was felt at a farm some 100 feet away from the dynamited area.

Engine-Adapting Kit

A conversion kit that adapts the new Ford valve-in-head 6-cylinder engine to any Ford or Ford Ferguson tractor has been announced by Funk Aircraft Co., Coffeyville, Kans. The Model AN Funk conversion is said to have double the horsepower of the original tractor, while retaining all the advantages of the Ford system. According to the manufacturer it has ample power for larger power-takeoff equipment and accessories and for pulling heavier machines on the drawbar.

There are also Funk conversion kits available for adapting the L-Head Ford 6-cylinder engine or the V-8. They will fit any old or new Ford or Ford Ferguson tractor. All Funk parts are designed and machined to fit in place without additional drilling or fitting by the mechanic.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 284.

A Lubrication Booklet

A comprehensive 26-page booklet on the whys and wherefores of lubrication has been issued by The Euclid Road Machinery Co., 1361 Chardon Road, Cleveland 17, Ohio. It details procedures for Eucild equipment and discusses the fundamentals of lubrication. Characteristics of lubricants, their properties and tests, reasons for oil and lubricant changes, proper lubrication intervals, and recommended procedures are also included.

This literature may be obtained from Euclid, or by using the Request Card at page 18. Circle No. 355.

Porter Buys Watson-Stillman

H. K. Porter Co., Inc., Pittsburgh, Pa., has acquired the Watson-Stillman Co., Roselle, N. J., manufacturer of forged-steel fittings and hydraulic equipment. The company will operate as a division of H. K. Porter and will continue under the direction of Edwin A. Stillman, President.

This acquisition is in line with Porter's policy of diversification, so as not to become completely dependent on any one industry. In the past few years, the company has expanded its operations into rubber, steel, electrical equipment, and forged-steel fittings by acquiring Quaker Rubber Corp., Connors Steel Co., Buffalo Steel Division, Delta-Star Electric Co., and now, the Watson-Stillman Co.

ONLY Champion HAS IT . . .

The New Patented Wide-Spread Leg Feature. Redistributed center of gravity. Practically non-tippable.

RUGGED — AND HOW! Water tight heavy gauge steel tray. Lapped and spot-welded corners. Seasoned clear oak handles weather-sealed in natural color. 4.00 x 8 pneumatic tire. Steel disc wheel with ball bearing inserts. Angle iron bumper. Concealed skid shoes. Extra heavy cast steel axle hangers. Engineered for perfect load balance. There's a Champion borrow to meet every requirement. Model 450CR illustrated. 5 cu. ft. capacity. Write for catalog. Dealer inquiries invited.

← 4 INCHES WIDER → CHAMPION WHEELBARROW CO. Byron Center, Michigan

6 JACKSON MONEY-MAKERS for '53

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1-B

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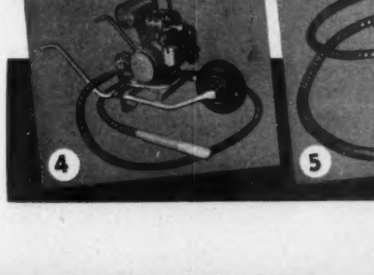

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1. A NEW, FASTER VIBRATORY COMPACTOR

(a) FOR BITUMINOUS MIXTURES — In highway widening and patching, paving drives, walks and kindred jobs, there's nothing like the self-propelling, highly mobile JACKSON COMPACTOR. Powered by a JACKSON Power Plant on auto trailer with quick pick up device for compactor, it will compact 2400 sq. ft. per hour close to maximum density.

(b) For COMPACTION OF GRANULAR SOILS — in concrete floor sub-bases, bridge approaches, close to abutments, and similar applications, the same machine described above, available with quickly interchangeable bases of 12" to 24" widths, will achieve specified density in 8" to 12" depths at the rate of 2400 sq. ft. per hour in granular soils of optimum moisture content. A tandem version is amazingly efficient in compacting sub-bases for pavement widening.

2. THE MOST PRODUCTIVE OF ALL SCREEDS — for municipal paving, highway widening, bridge decks, etc. The JACKSON vibratory electric screed, powered by a JACKSON Portable Power Plant, strikes off to all crowns, undercuts at curb or sideform, works right up to and around manholes and other obstructions. Permits pouring slabs up to 30' wide without center joints. May be rolled back for second passes on 4 rollers.

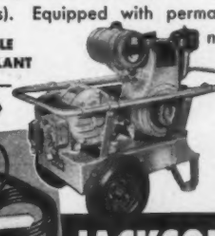
3. MASS CONCRETE VIBRATOR — Offers the fastest, most efficient means of placing mass concrete in dams and similar construction.

4. 6 H.P. ENGINE-DRIVEN, FLEXIBLE-SHAFT VIBRATOR — provides the last word in uninterrupted service and reliability. Ideal for both thin and thick concrete sections.

5. 2½ H.P. ELECTRIC VIBRATOR (for light-socket operation) — Handy as a pocket in a shirt, powerful enough to handle all general construction concrete vibration.

6. DUAL CURRENT PORTABLE POWER PLANTS — Provide both single and 3-phase, 60 Cy. 120 V, AC. (also 240 V in larger Models). Equipped with permanent-magnet generators requiring no maintenance or adjustment. 1.5 to 7.5 KVA capacities.

PORTABLE POWER PLANT Model JV2500 — 2.5 KVA 6



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Five Miles of Four-Lane Concrete

Workman drives a form pin every 15 seconds with Thor pneumatic hammer.

By ALBERT C. SMITH
Associate Editor

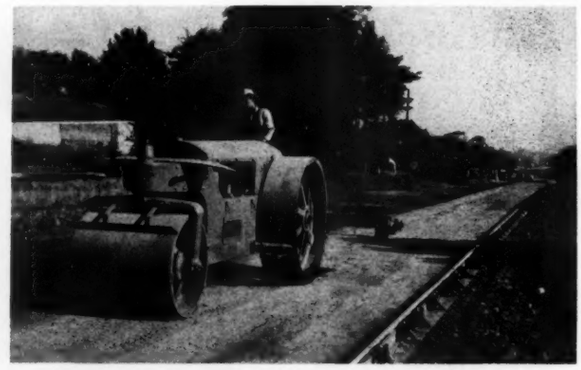
Extend Garden State Parkway To Populous North Jersey Area

• HOTEL owners and boardwalk concessionaires up and down the New Jersey seashore, still licking their chops after 1952's record summer, have excellent prospects of greeting even bigger throngs this year. With the Turnpike feeding the Atlantic City to Cape May area, and the new Garden State Parkway sections opening the valve further on Monmouth and Ocean County beaches, the 125-mile stretch of sand and surf should sell more soda pop and suntan oil than ever before.

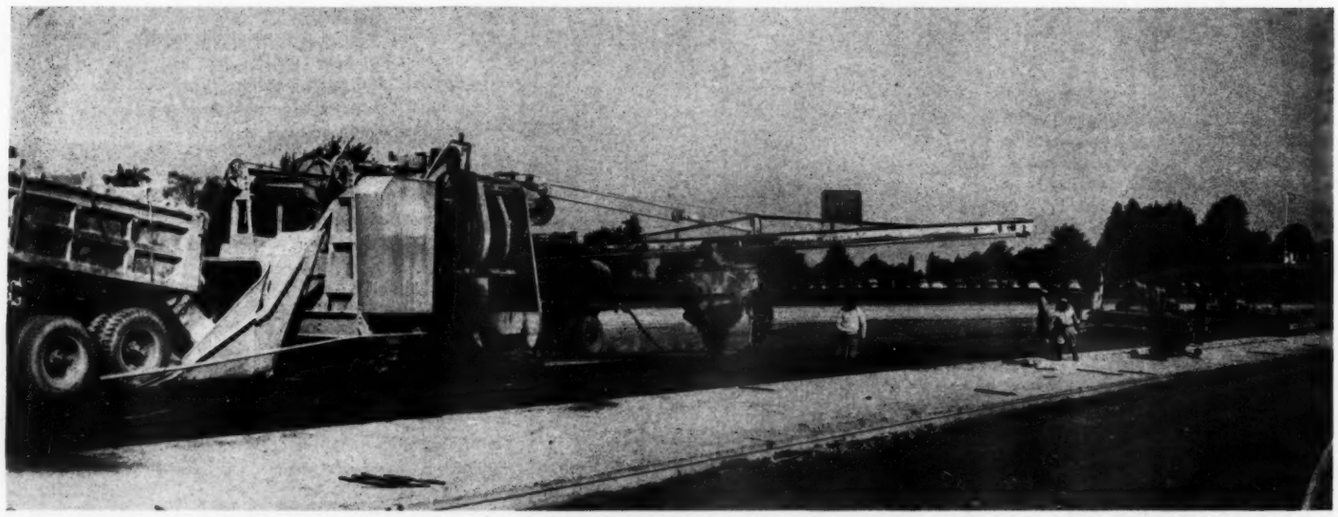
The fabulous stretch of coastline is already host to over 25,000,000 vacationers a year. Moving that many people, mostly in automobiles, requires an extensive network of arteries and sub-arteries. To complicate the problem, the bulk of the travelers move south on Friday night and make the return trip two nights later. And naturally, if Old Sol is beaming bright on Sunday afternoon, more than a few are reluctant to leave the cooling surf early in order to "beat the rush home".

The New Jersey Highway Department had the solution some years ago when it announced plans for the Garden State Parkway. A controlled-access highway, the new route was planned to run 180 miles from near the New York State border to Jersey's southern tip at Cape May. It would not only uncork a good part of the North Jersey bottleneck but would run generally parallel to the shore. The proposed route would bring one-third of the State's population within 3 miles of the Parkway in the 5 metropolitan counties of Bergen, Passaic, Essex, Union, and Middlesex. Over 11 miles

A Buckeye Finegrader removes excess material from between the forms.



The finegrade gets final compacting from a Galion roller.



A Ransome 34E dual-drum paver dumps a bucketful of fresh concrete (above) as a Jaeger transverse finisher and a Koehring Longitudinal Finisher follow. (below)

of 4-lane super-highway had been completed by 1951, and another 7 miles is now under construction. Recently, however, the job of finishing the route quickly was turned over to a new agency, the New Jersey Highway Authority, and the project will be completed as a self-liquidating toll road.

The sections now being constructed by the State's Highway Department will complete the Parkway from the Raritan River to U. S. Route 22, a major east-west highway. Both bridge and pavement work is proceeding rapidly on this section, and Route U. S. 22 should be funneling most of the metropolitan-shore traffic into the Parkway by the beginning of this summer.

Pavement

Pavement on all sections constructed to date is 8-inch plain concrete. Lanes are 12 feet wide and in normal sections are at a 1 per cent slope from the center line. All curves are superelevated and grades are kept under 2 per cent wherever possible.

On the new section, there is a 3-foot penetration-macadam shoulder on the median side and a similar 10-foot shoulder adjacent to the outside lane. The inside shoulder slopes at 4.75 per cent and the outside at 6 per cent. Both are 4½ inches thick with a rough texture to discourage drivers from wandering off the concrete lane. All shoulders and pavement are placed on 8 inches of selected subbase.

Aesthetic considerations were an important factor in the design of the Parkway. The original route was selected to preserve valuable landscape features. Both the median width and the elevation of opposing lanes vary according to the natural contour of the ground. The median varies from 34 to 90 feet, permitting graceful swale drainageways and pleasing slopes.

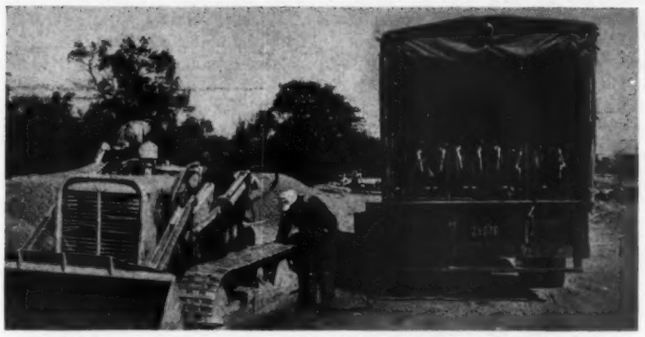
Acceleration and deceleration lanes provide new design features. The broad right-of-way makes possible wide turns and long merging strips. Acceleration lanes converge with the main highway at an angle of 1½ degrees and are 1,000 feet long. A 12-foot slab enters on a flat curve of 10,000-foot radius. Deceleration lanes begin on a 12-foot slab that runs parallel to the main road for 600 feet and then turns in a series of increasingly sharp compound curves which approach a spiral casement.

No Expansion Joints

Part of the section now under construction is playing an important part in the State's extensive pavement studies. Eight-inch plain concrete is being laid with contraction joints every 20 feet. There are no expansion joints. This design induces early cracking, which prevents large openings at only a few points. It also causes the slab to break around the large aggregate, insuring the best interlock. The joints are 2½ inches deep, ½ inch on top and ¼ inch on the bottom. The edges have a ¼-inch radius. Bituminous mastic is poured in the joint after several days.

New Section

The 4½-mile section of 4-lane concrete work that will complete the Parkway to U. S. Route 22 in Union was started in May, 1952, by Union Building and Construction Company of Passaic, N. J. The contractor had already finished a 3½-mile stretch of Parkway pavement in the first section and was well organized to move in on the new work.



This mobile service station with Lincoln grease rig makes periodic stops at each of the contractor's jobs. Here an Allis-Chalmers tractor gets a Gulf lubrication.

The two main items are 120,000 square yards of 8-inch plain concrete and 58,000 cubic yards of pit-run gravel subbase. Up to 30 trucks were used to haul subbase 13 miles from Chatham. On the site it was spread with a Cat D8 bulldozer and compacted with a wobble-wheel roller pulled by a Case tractor. A Cat grader was used for final shaping. Specifications provided that the subbase contain not more than 7 per cent of elutriable material.

Fine-Grading

Form setting and grading is done mostly by hand. The contractor explains that because of the large number of men he needs available for hand screeding the many odd-width approaches, it is cheaper to use men on form setting than to employ special machines.

About 9,300 linear feet of 8-inch steel Blaw-Knox forms with built-in keyway are enough to keep ahead of the paver. Form-setting operations always keep one day ahead of concrete.

(Continued on next page)

P&H Diesel Engines

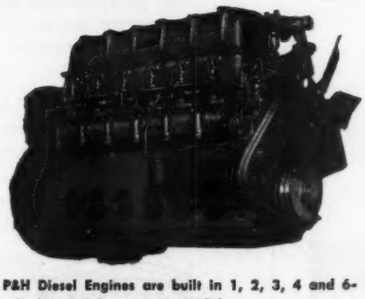
(2-CYCLE)

Can your diesels match this torque curve?

This is the torque curve for the P&H Model 687-C Diesel Engine. Note how the torque characteristics are sustained throughout its entire horsepower range.

That means steady, responsive power at all speeds — greater lugging "ability" for those toughest jobs. It's the kind of unfaltering performance that assures more profits in any service, constant or intermittent.

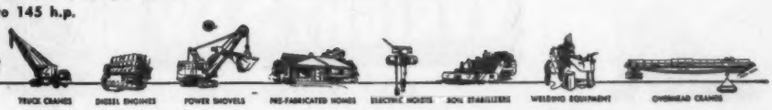
Steady torque for steady work is just another outstanding feature of P&H Diesel Engines — America's most advanced line. Ask your P&H Diesel representative for the full story. Or write for literature.



P&H Diesel Engines are built in 1, 2, 3, 4 and 6-cylinder models — up to 145 h.p.

P&H DIESEL DIVISION
HARNISCHFEGER CORPORATION
CRYSTAL LAKE, ILLINOIS

the P&H Line



TRUCK CRANES · DIESEL ENGINES · POWER SHOVELS · PRE-FABRICATED HOMES · ELECTRIC HOISTS · SOIL STABILIZERS · WELDING EQUIPMENT · OVERHEAD CRANES

Four Concrete Lanes

(Continued from preceding page)

After center-line and side pins are set, a Cat grader cuts a trough along the outside of each lane to loosen the hard subbase. Workmen then adjust the form grade with hand shovels and tampers. Stone screenings are used to fill low spots.

When the forms are set to grade, pins are driven through them with a Thor pneumatic hammer operated from a truck-mounted Jaeger compressor. With this setup, one man can drive a pin every 15 seconds.

As the forms are set, a Buckeye Finegrader follows along to eliminate any imperfections. Final compacting is done with a 5-ton 3-wheel Galion roller followed by a hand roller. The grade is checked with a string and wooden foot gage. Forms are oiled with a hand-operated garden spray.

The 1:1.68:3.36 concrete is air-entrained with 2 ounces of Protex agent per 9.25-bag batch added automatically on the mixer. Cement is type 2A Hercules with a factor of 6.7 bags per cubic yard of concrete. Traprock aggregate is 55 per cent 1½-inch stone and 45 per cent ⅝-inch stone.

The weights for a 9.25 bag batch are:

Cement	870 pounds
Sand	1554 pounds
Stone, 1½-inch	1702 pounds
Stone, ⅜-inch	1388 pounds
Water 37.1 gals. per batch (average)	

Paving Operations

All concrete is mixed in a Ransome 34E dual-drum paver. Total mixing time is 107 seconds. The unit works outside the forms and dumps concrete from a 1⅓-yard bucket operating from a 35-foot boom. Production averages over 2,000 yards a day, with some days as high as 2,600.

A portable pipe stanchion with meter taps city water where convenient. Two 1,300-gallon tank trucks supply water to the paver.

Concrete is batched at the North Jersey Quarry Company in Summit, a distance of 7 miles. Eleven 4-batch Mack diesel trucks with 10-yard bodies make the haul. A Blaw-Knox bulk-cement bin and aggregate bin load the batches.

As the concrete is dumped, it is vibrated with a Viber unit and then spread by a Jaeger-Lakewood transverse finisher with double screeds.

when service is important think of

AMSCO

Made entirely of "The Toughest Steel Known," AMSCO Manganese Steel welded dippers use no rivets, but are fabricated by the modern, streamlining Plug-Welding method that permanently interlocks cast segments.

All AMSCO Manganese Steel products mean service and long life wherever impact and abrasion must be controlled. AMSCO Manganese Steel has the unique quality of actually becoming harder with use, acquiring a high surface polish to shrug off grinding abrasion, while retaining body metal toughness.

AMSCO All-Manganese Steel Dippers are available in two-piece welded, three-piece renewable lip, and Missabi designs—or can be adapted to your unusual materials handling specifications. Also available in sizes to fit all power shovels.

Write AMSCO, Chicago Heights, Illinois, for bulletins on dippers and back-hoe buckets.

AMERICAN Brake Shoe COMPANY — AMERICAN MANGANESE STEEL DIVISION
395 EAST 14th STREET • CHICAGO HEIGHTS, ILL.

Other Plants: New Castle, Del., Denver, Oakland, Cal., Los Angeles, St. Louis. In Canada: Joliette Steel Division, Joliette, Que. Amsco Welding Products distributed in Canada by Canadian Liquid Air Co., Ltd.

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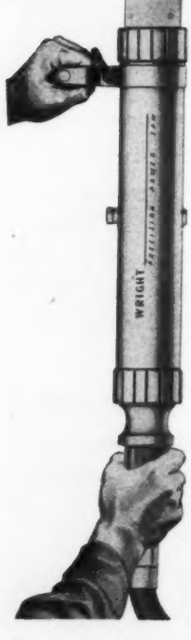
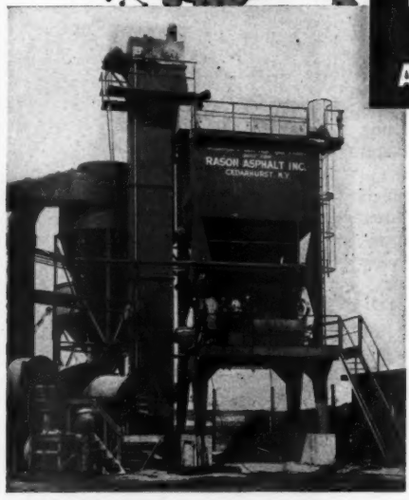


- **New principle**—21-inch capacity twin blades are unbelievably fast . . . won't grab or bind.
- **Accurate**—line-of-sight accuracy . . . won't wander off cutting line.
- **Safe**—so safe no guard required . . . stops instantly.
- **Light**—15 lbs. . . . **Low air consumption**—operates off 60 cu. ft. compressor . . . **Versatile**—all types of cuts in any wood . . . **Built to last.**
- **You won't believe it until you see it**—ask your dealer for a demonstration, or write: Wright Power Saw & Tool Corp., 292 Longbrook Ave., Stratford, Conn. BRidgeport 7-4910

IT'S THE WRIGHT SAW FOR YOUR JOB

See why sales of the STANDARD RB ASPHALT PLANT have increased over 500% in one year!



Take a close look at the pattern of *Standard RB Asphalt Plant* installations. You'll notice when one RB plant starts operating in a locality, others soon follow. That explains why STANDARD sales have zoomed over 500% in a year. The word is passed from contractor to contractor—"HERE'S THE SWEETEST PERFORMING PLANT IN AMERICA—a bearcat for economy, ruggedness and high capacity."

But the best way to *SEE* the reason for the RB's popularity is to watch the plant in action. Balanced flow is the secret—assured by such features as extra-large dryer capacity and oversize elevators, vibrating screens and air handling systems. There are no stops—no bottlenecks. Write today for the address of the Standard Plant nearest you and—*SEE FOR YOURSELF.*

UNIT BUILT—8 SIZES, 500 to 6000 POUND BATCH CAPACITIES
FULL DESCRIPTIVE LITERATURE ON REQUEST

STANDARD — 50 YEARS

STANDARD STEEL CORPORATION
5007 Boyle Avenue, Los Angeles 58 ★ 419-7 Commonwealth Avenue, Boston 15

Following right behind is a Koehring Longitudinal Finisher.

Hand finishing consists of first smoothing with a wood float, setting the 2½-inch-deep contraction joint, secondary floating, and then burlap dragging.

Before the joint is made, a 1-inch-thick board is laid flat across the wet concrete so that the forward edge runs along one side of the future contraction joint, thus acting as a guide. When in position, it is clamped tight to the form on each end. Then a 3½-inch-deep strip of wood with the lower 2½ inches cut the same as the joint is pushed into the concrete along the forward edge of the clamped board until the tops of the two are flush. Wing nuts on the board are turned over the joint strip to hold it down in the wet concrete. After about 10 minutes, the concrete sets enough to grasp the strip, the wing nuts are turned, and the wooden guide is unclamped and moved forward to a new joint. The wooden strips are kept in the concrete until set.

Longitudinal joints are of the keyway type without joint filler. Half of the joint is constructed in one lane and half in the adjoining lane. A surface groove ¼ inch wide and ⅞ inch deep is formed by using a ⅛-inch edging tool on the first lane and a ¼-inch tool when the second pour is made. The groove is sealed with a bituminous mastic. The abutting 8-inch face of the first lane poured is coated with a tar paint.

At the end of each day pours are stopped midway between joints. No joint is made, but 3-foot-long ¾-inch deformed bars 12 inches on center are set in place to provide a load transfer.

Klearcure colorless cure is applied by a Flex-Plane machine at the rate of one gallon per 22 square yards. Forms are left on overnight.

Personnel

Dow R. Drukker, Project Manager for Union Building, expects the work to be completed early this year, unless steel delays prohibit work around the bridges. Drukker has a total of 70 men on the job, and uses 5 General Electric radio sets to keep everything coordinated. Improved communications through radio, he said, are saving plenty of time and money.

Another device that is saving the contractor both time and money is a rolling service station. It follows the equipment around doing on-the-spot greasing, oiling, etc.

Mounted on an F-7 Ford, the 10¾-ton unit carries a portable air compressor which provides air for inflating tires and operating high-pressure grease guns. Gulf oils and greases are dispensed directly from the containers carried on the truck. It starts out in the morning with 200 gallons of water, 500 gallons of oil and grease, about 55 gallons of solvents, reels, pumps, generators, and hundreds of feet of hose.

The program is being directed by Ransford J. Abbott, Commissioner, and E. W. Kilpatrick, Highway Engineer of the New Jersey State Highway Department.

Construction is under the direction of H. D. Robbins, Supervising Engineer, Construction, Roads; R. M. Beck, Northern District Engineer; and A. A. Paul, Principal Engineer.

Mobile Post Driver

A lightweight mobile post driver operated by gasoline motor power takeoff and mounted on a trailer, jeep, or tractor is now being marketed by The Danuser Machine Co., Fulton, Mo. It will set steel or small wood posts in rocky or hard-frozen ground, and drives posts up to 4 inches in diameter without sharpening. It tilts to any angle for driving posts on uneven ground or hillsides. Inverting the driver head makes it a

pavement breaker or earth-tamping tool. One man can operate the unit.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 340.

Low Cost Screening
with the
Pioneer Edge

Low-cost gravel plant turns out 50 tph !

EVEN small jobs can be profitable when you use this simple, efficient PIONEER Buzzer Screen.

Mount it on any PIONEER Portable Conveyor of 50 feet or more in length . . . keep it permanently attached as you move quickly from pit to pit, from job to job. It's ideal for inexpensive on-the-spot screening on hurry-up patching, maintenance, or other small jobs. Just the thing for the contractor who wants to start in business with a minimum outlay for equipment.

The conveyor-driven PIONEER Buzzer Screen has its own mounting and is easy to install. The 18 square feet of live wire screening surface scalp off the oversize and easily deliver as much as 50 tons of ¾ inch minus material per hour. Here is another example of the famous PIONEER EDGE in action . . . and how it is busy reducing production costs for gravel producers all over the world.

★ ★ ★

The 3' x 6' PIONEER Buzzer Screen is also available with special mounting for over-bin use. Includes 8' 10" sills and special motor mount. Slope is adjustable in steps from 10° to 18°. An ideal, inexpensive setup for sizing and separating where feed is not too heavy.

FEATURES—SPECIFICATIONS
Pioneer Continuflo Buzzer Screens

1. Two Bearing Buzzer Type Screen—Size 3' x 6', with Variable Counterweights.
2. Support Sills and Attachments for 18", 24", and 30" Portable Conveyors.
3. Pioneer Band Clutch for Stopping Conveyor.
4. Oversize Spout.
5. Support for Spout and Lower End of Screen.
6. Countershaft and Drive to Screen.
7. Operates on only 3 more HP than is required for Conveyor and Feeder alone.

Approximate Weight: 1170 lbs.

BUY BOTH! HIGHER OUTPUT LOWER UPKEEP

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☐ GRAVEL PLANTS	☐ WASHING PLANTS	☐ MECHANICAL FEEDERS
☐ ROCK PLANTS	☐ BITUMINOUS PLANTS	☐ VIBRATING SCREENS
☐ JAW CRUSHERS	☐ APRON FEEDERS	☐ BUZZER SCREENS (LIGHT DUTY)
☐ ROLL CRUSHERS	☐ ORE FEEDERS	☐ CONTINUFLO CONVEYORS

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*City*_____ *Zone*____ *State*_____

No Soot--No Fumes
COMPLETELY-PORTABLE
4 Sizes Available

Use the super jet space heater with complete combustion providing clean, fume free, fast, safe heat. Completely portable — 4 sizes available—capacity 100,000 BTU per hour to 1,200,000 BTU per hour. General Electric Jet Burner and control — fuel — kerosene, No. 1 fuel oil or No. 2 fuel oil, natural gas or liquid petroleum.

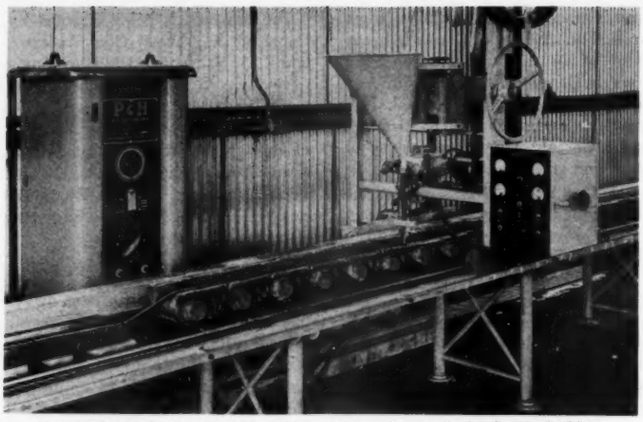
Write Today for Complete Information
DEPT. CM-1
HABCO MFG. CO.
Columbus, Nebraska

Welder-Positioner Rebuilds Track Rails

A fully automatic welder-positioner for crawler-track-rail rebuilding and other longitudinal welding is now in production by Dean Weld Machine, Inc., 10154 Edes Ave., Oakland, Calif.

Principal advantages claimed for the machine include fast setup, negligible distortion, fully automatic operation, and fast operation. Crawler tracks do not have to be disassembled for rail rebuilding. The 40-foot positioner bed will accommodate a full-length track. The low heat required reduces distortion so that track pins may be turned after welding. Automatic controls break and restart the arc at each link joint so that build-up metal does not fill the rail joints, and cutting or grinding after welding is virtually eliminated.

The company claims that the typical 76-link track can be rebuilt in one 8-hour day with a single operator, including setup and finishing time.



Dean Weld Machine's automatic welder-positioner for crawler-track-rail rebuilding.

The machine also handles longitudinal welding such as box-beam fabrication, scraper-blade and bulldozer-lip rebuilding, and welding or build-up on any sections which can be positioned in the 40-foot x 28-inch welding bed. Extra 10-foot bed extensions are available. The unit is shipped complete with bed, carriage, welding head, 500-amp transformer, and all controls and cables.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 356.

Blueprint Cabinet

Improvements in its cabinet for storing and filing blueprints have been made by the Empire Development Corp., 15 Park Row, New York 38, N. Y. The cabinet, which is made to handle 1,000 prints measuring up to 48 x 72 inches, now comes equipped with a combination lock for the secure filing of confidential papers.

The interior has been improved with new aluminum fastening strips that can hold from 1 to 50 prints so that group drawings pertaining to the same subject may be filed together for projects.

The rigidity and stability of the cabinet as a whole has been improved with reinforcing bars in the cabinet corners and heavy steel bracing in the back, according to the manufacturer. The exterior now comes in a hammered finish that covers all welded marks.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 302.

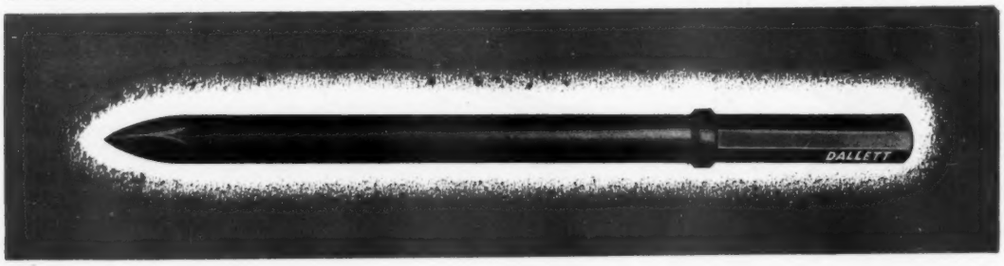
Data on Self-Computing Rod

A folder on a new rod on which the elevation can be read directly has been released by Lenker Mfg. Co., 599 Chestnut St., Sunbury, Pa.

Additions and subtractions of back and fore sights are eliminated through the use of an endless graduated steel band that runs over end rollers to bring any reading into view. The L-E-Vation rod is placed on a bench mark and the band is moved until the elevation of the bench mark can be read through the level. The band is then locked in that place. As the numbers read downward, wherever the rod is held it will indicate the correct elevation.

The rod will do the same work as an ordinary rod. It is 5.4 feet long when closed and 10 feet extended. A 14-foot reading may be obtained by using a 4-foot boot or extension.

This literature may be obtained from the company, or by using the Request Card at page 18. Circle No. 275.



BIG CITY BUYS 3211 DALLETT CONTRACTORS STEELS, REPORTS ONLY FOUR BREAKAGES

A big eastern city was plagued with breakages of contractors steels. Broken steels were slowing up work and increasing costs. About two years ago, they tried Dallett Contractors Steels with the agreement that all breakages would be reported.

They have purchased 2423 Dallett Moil Points and 788 Dallett Asphalt Cutters during the past two years. At the last check, they had reported only four moil points and no asphalt cutters that had broken before the first sharpening. In the past, asphalt cutter breakage had been most troublesome.

The city officials liked the service given by Dallett Contractors Steels so well that they have virtually standardized on them for all departments.

When you figure it out, the breakage rate for this customer was about one-eighth of one percent—an almost perfect record! If you, too, are having trouble, order some steels from us today. Try them out and keep records. You will want to standardize on Dallett Contractors Steels.

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DRAGS **PECKERWOOD** DRAGS
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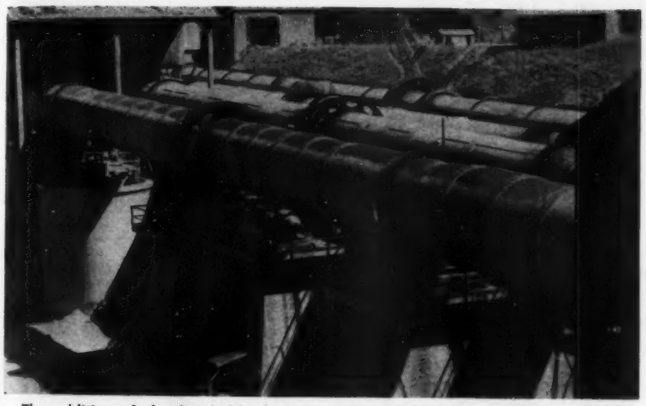
MADE IN ANY C-O-N-T-I-N-U-O-U-S LENGTH UP TO 12 FEET
WIDTH 6 INCHES—IT'S DIFFERENT
ASSEMBLE YOUR OWN—IN ANY SHAPE REQUIRED—IN MINUTES, NOT HOURS
NO FRAME REQUIRED
MADE WITH KILN DRIED 6" WIDE HARDWOOD AND HEAVY SPRING STEEL WIRES TRIPLE OUT EACH HOLE. NOT STAPLE SET.
THIS IS IT! ORDER NOW

ILLUSTRATION OF 10-FOOT LENGTH
ONLY $3.50
RUNNING FOOT F.O.B. KC., MO.
NOTICE! Our 15" length Unit Drag 3" wide with the two bolts that fits your frame, still $2.50 ea.
SINCE 1928 **VAN BRUSH MFG. CO.**
327 SO. WEST BLVD., KANSAS CITY 8, MO.



The addition of the fourth kiln (extreme background) at the San Andreas, Calif., plant of Calaveras Cement Co., has increased plant capacity by 50 per cent.

Calaveras' New Kiln

The fourth kiln at the San Andreas, Calif., plant of Calaveras Cement Co., which went into production early in September, marked the completion of an expansion and modernization program costing over $2,500,000. The kiln, 360-feet long with an 11-foot 3-inch diameter, increases plant capacity by approximately 50 per cent. Related equipment which also went into operation recently includes raw grinding mills, a $250,000 dust collector, a cooler, quarry equipment, and blending and storage silos.

The kiln was built by Moore Dry Dock Co., Oakland, Calif., under subcontract from Allis-Chalmers Mfg. Co., Milwaukee, Wis. A. A. Hoffman, Vice President and Consulting Engineer of the San Francisco firm, which manufactures gray, white, and plastic cements, supervised the installation of the new equipment.

It is hoped that the additional production will help prevent future cement shortages such as those which occurred in northern California during 1950 and 1951.

Anti-Rust Paint

Addition of three new colors to its anti-rust paint line is announced by The Monroe Co., Inc., 10703 Quebec Ave., Cleveland 6, Ohio. Formerly available only in black, aluminum, and clear, Rust-Cure paints are now also offered in red, gray, and green.

Special chromate pigments have been added to colors to give extra protection against rust. These chromates are said to combine with the vegetable-oil base to resist moisture, temperature changes, chemicals, acids, and fumes.

The company states that the paints can be applied by brush or spray directly over rusted surfaces without wire brushing or sandblasting. One coat is sufficient to prime, penetrate, and seal all metal surfaces and no primer coat is required.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 293.

Data on Pipe-Threader Line

Two folders on its line of pipe-threading machines have been released by Beaver Pipe Tools, 325 Dana St., N. E., Warren, Ohio. One deals exclusively with the Model 55 universal nipple chuck, which threads pipe from ⅛ to 2 inches with proper adapters. A price list is included.

The other folder gives specifications for three models of portable pipe and bolt machines and two power drives. A lightweight, a utility, and a heavy-duty model are described and illustrated.

This literature may be obtained from the company, or by using the Request Card at page 18. Circle No. 301.

The automatic exhaust pipe cover. Sizes available to fit from 1" to 6-3/16" exhausts, O. D.

WEATHERCAP provides positive year 'round protection for all engines with vertical exhaust pipes: compressors, road pavers, mixers, crushers, generators, etc. Fully automatic — opens and closes instantly by means of engine exhaust. Seals out rain, snow, dirt, insects . . . prevents flooded pistons, cracked cylinder heads, rusted or warped valves. Quality-built of heavy gauge steel with balanced fins made to uniform specifications conforming to engine exhaust pressures. Low in cost — years of service. Immediate delivery. Write today for full particulars and prices.

ANTHES FORCE OILER CO., AVE. M AT 20TH ST., FT. MADISON, IOWA

HERCULES

makes them all—and makes them better!

Hercules-Willard Concrete Mixer

CONTRACTORS' EQUIPMENT

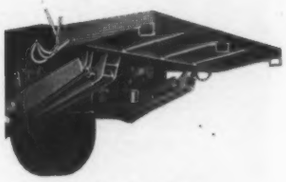
Hercules-built Willard Concrete Mixers with "the big throat" charge and discharge faster; compact size and light weight. Hercules Heavy-Duty Rock Bodies and Hoists have proved their ability to stand up under severest tests on thousands of jobs from coast to coast.

Rock Bodies and Hoists

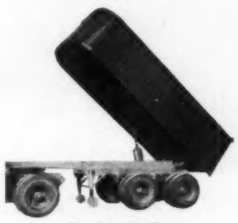
Dump Bodies and Hoists

TRUCK EQUIPMENT

No matter what your hauling or dumping needs, or what make of truck you use, it will pay you to choose from the complete Hercules line of Medium and Heavy-Duty Hydraulic Hoists, Dump Bodies, and Accessories (including Mechanical Power Chutes, Hydraulic Lift Tailgates, Spreaders). Many exclusive performance-boosting features.



Hydraulic Tailgate



Tandem Trailer

TRAILER EQUIPMENT

Hercules Heavy-Duty Dump Bodies and Hydraulic Hoists are specially engineered for mounting on single axle, tandem axle, and 4-wheel trailers. Body lengths up to 20 feet; capacities to 25 tons.

4-Wheel Trailer

Cement Spreader

SPREADER EQUIPMENT

Hercules Cement Spreaders for soil stabilization projects spread desired amounts evenly up to 10-ft. width. Advance-designed Hercules units for spreading cinders, salt, sand, and chips are also available.

Chip Spreader

THE BIG NEWS is Hercules

. . . expanded engineering activity . . . a fast-growing line of advanced equipment specifically designed to win out in comparison with any other makes . . . plans for still more products that will do more work, faster, better, at lower cost. Ask your nearby Hercules Distributor for complete information or write the factory direct.

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for various types of Hercules equipment are available in some areas. Investigate now.

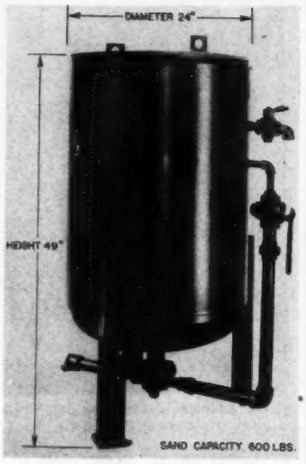
HERCULES STEEL PRODUCTS CORPORATION · GALION, OHIO

A hanging platform, suspended from two wheels that roll on the crane rail, eliminated conventional scaffolding for Howard P. Foley Co., electrical subcontractor on Link-Belt Co.'s new plant at Colmar, Pa. The Austin Co. was designer and builder.

Sand-Blaster Nozzle

A portable sand blaster with a new nozzle which is said to speed sand blasting of paint, rust, or scale is introduced by the Vacu-Blast Co., Inc., 350 Peninsular Ave., San Mateo, Calif.

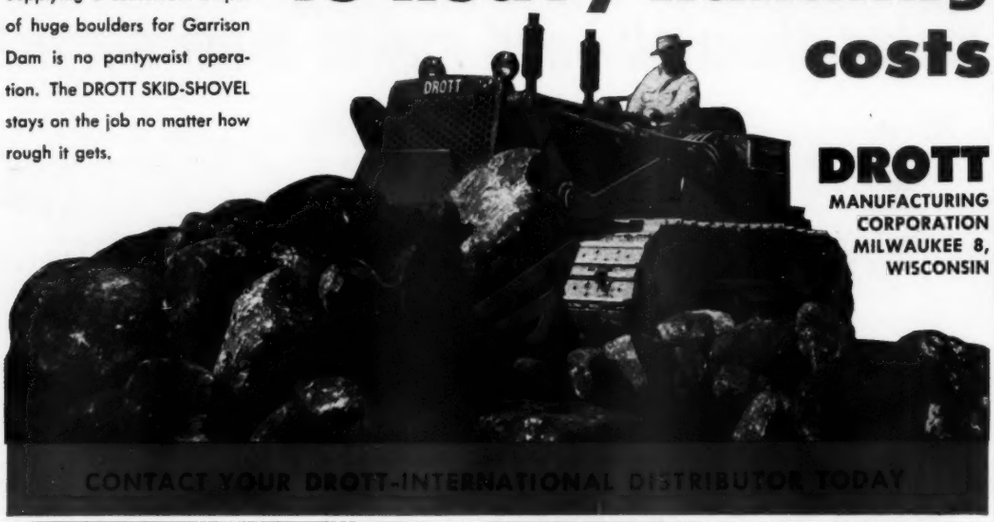
The important characteristics of the Belmont's new nozzle is its venturi profile, which achieves higher blasting efficiency by eliminating throat choking and muzzle turbulence that ordinarily dissipate the force of abrasive action. The air blast reaches supersonic velocities, increasing the grit speed to give more rapid and efficient cutting on the work surface, the company explains. The nozzles are made of tungsten carbide for long life. The sand blaster comes in three sizes ranging from 125 to 1,000 pounds sand capacity.



Further information may be secured from Vacu. Or use Request Card at page 18. Circle No. 265.

PUT THE SKIDS to heavy handling costs

Supplying a continuous output of huge boulders for Garrison Dam is no pantywaist operation. The DROTT SKID-SHOVEL stays on the job no matter how rough it gets.



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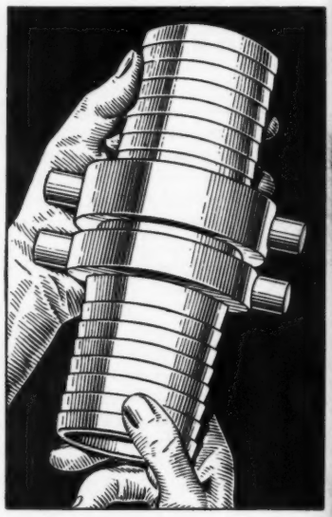

"KING" Shank Coupling

This is the Shank Coupling which the Construction Industry and all other users of suction and water hose rely on for long, reliable service, regardless of rough handling.

The "KING" is a brute for punishment, yet thoroughly refined in every detail of manufacture . . . absolute uniformity in quality, dimensions and threading . . . well defined, smoothly finished corrugations. Made in light and heavy patterns, in all-malleable iron, plain or plated; all-brass; and plain or plated malleable iron shanks with brass swivel nut. Size range from 1" to 8", inclusive.

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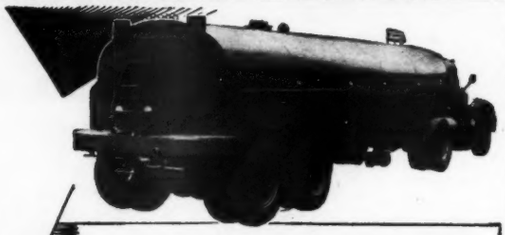
DIXON VALVE & COUPLING CO., LTD., TORONTO. Associate Companies:

Supply Tanks FOR HAULING HOT OR COLD BITUMINOUS MATERIALS



Semi-Trailer models are made by the famous Littleford Frameless Construction — no trailer frame is needed.

To keep the Spraying Units on the job the Littleford Supply Tanks hauls the Bituminous materials from the source of supply without interruption. These Supply Tanks are the backbone of all road construction and maintenance jobs. Made with or without heating units or transfer pumps, these units speed up the work, are economical to operate and save labor costs. Made in semi-trailer or truck mounted models in sizes ranging from 2000 to 5000 gal. Semi-Trailers, made without the use of a trailer frame, are known as the "Littleford Frameless Constructed Supply Tank".

Make your next road job a low cost modern undertaking, use modern methods and modern equipment, Littleford Supply Tanks.

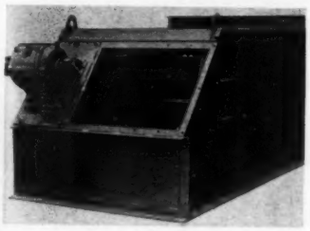
The Littleford Supply Tank transfers its Bituminous Material to the Bituminous Distributor for fast economical spraying.

BLACK TOP ROAD MAINTENANCE EQUIPMENT · LB · SINCE · 1900
LITTLEFORD
LITTLEFORD BROS., INC.
485 E. Pearl St., Cincinnati 2, Ohio

New Vibrating Screen

A new vibrating rod grizzly for scalping about 400 tons of material an hour is announced by Nordberg Mfg. Co., Chase & Oklahoma Aves., Milwaukee 7, Wis. The Symons K-RG is designed for heavy-duty service in dry, wet, sticky, or gummy rock and ore.

It is applicable for separations from ½ to about 4 inches, and can be used following most sizes of primary crushers and ahead of secondary crushers. It serves primarily as a single-cut scalping unit. A large feed intake opening and ample clearance between the power unit and the screen deck permit an unobstructed flow up to 12-inch feed size.



The grizzly is built with a 50-inch-wide x 8-foot-long screening surface using ½, ⅝, or ¾-inch spring steel rods in three bays, and the vibrator unit or power mechanism is located at the discharge end. Motor and drive are installed outside the housing away from the dust. Drive is through a flexible coupling and the pulley runs true eliminating undue wear on the belts. Positive vibration is achieved by an unbalanced weight which will not dampen out with heavy loads and eliminates overthrow when starting or stopping, the company claims.

The Symons grizzly weighs 7,500 pounds, is 62 inches high at the feed end, and 56 inches at the discharge end. It is 12 feet long and has a width of 68½ inches. The unit comes complete with V-belt drive and mounts for the 10-hp motor.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 354.

Load Capacity Vs. Frost

The percentage loss of strength that may occur in highways subjected to freezing and thawing action has been the object of a survey conducted by the Highway Research Board. The fourth report on this work, Bulletin 54—"Load Capacity of Roads Affected by Frost"—has recently been published by the Board. It includes reports submitted by Iowa, North Dakota, Ohio, and Oregon. Iowa and North Dakota projects continue to show loss in strength due to frost action; Ohio used a road of sufficient design strength to support the test load throughout the year; and Oregon is still working on a full cycle of 1-year tests.

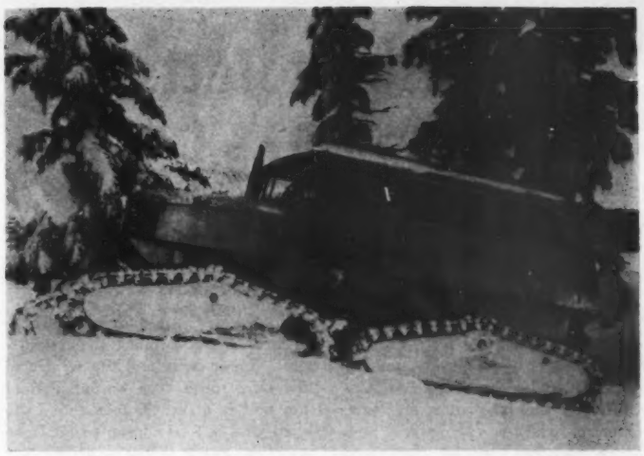
Complete with graphs and tables, the 21-page bulletin is available from the Highway Research Board, 2101 Constitution Ave., Washington 25, D. C. It is priced at 30 cents per copy.

Data on Metal-Cutting Torch

How to gouge and cut metals with carbon arc and compressed air is described in a brochure available from the Arcair Co., 2614 Burwell St., Bremerton, Wash.

The literature illustrates the Arcair torch being used on maintenance jobs. Complete operating instructions are included.

This literature may be obtained from the company, or by using the Request Card at page 18. Circle No. 255.



Acrylic plastic Plexiglas is now being used on the Sno-Cat tractor. It is said to withstand very low temperatures as well as the twisting stresses set up in window and door frames as the unit negotiates rough terrain. Further information from the Sno-Cat Corp., Medford, Oreg. Or use the Request Card at page 18. Circle No. 277.

For the Finest in Chain Saw Performance — Lombard Model 7 Two Man Saws with new Warren High Speed Chain

Dept. 7 — 12% more power, 10 lbs. lighter weight

LOMBARD GOVERNOR CORP.
ASHLAND, MASSACHUSETTS

LOOK JOE!...in SECONDS A... Clipper MASONRY SAW ...WILL CUT THE HARDEST BRICK-STONE-TILE!*

*and at the lowest cost per cut

AND A... Clipper MASONRY SAW

LOOK FOR THE BRIGHT ORANGE COLOR AND THE TRADE-MARK CLIPPER!

...will PAY FOR ITSELF from the SAVINGS in TIME and MATERIAL

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Only with These Patented Clipper Features is Masonry Cutting Economical...

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SELECT-A-NOTCH

WET OR DRY PUMP

TODAY!...Try the New—Faster Cutting—Economical CLIPPER SUPERIOR BLADES

...guaranteed to "Consistently Provide the fastest cut...at the lowest cost...with the greatest ease!" Clipper alone can supply all specifications of Abrasive, Diamond and "CBR" (Break-Resistant) Blades to accurately meet your requirements. INVEST IN CLIPPER and YOU'LL GET RESULTS!

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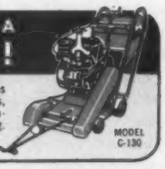
Save up to 50% in labor and material. Saw repair patches —gas, water, sewer and air line trenches in floors, streets, walks, runways and highways. Saves, too, by sawing contraction joints—eliminate costly hand forming and spalling.



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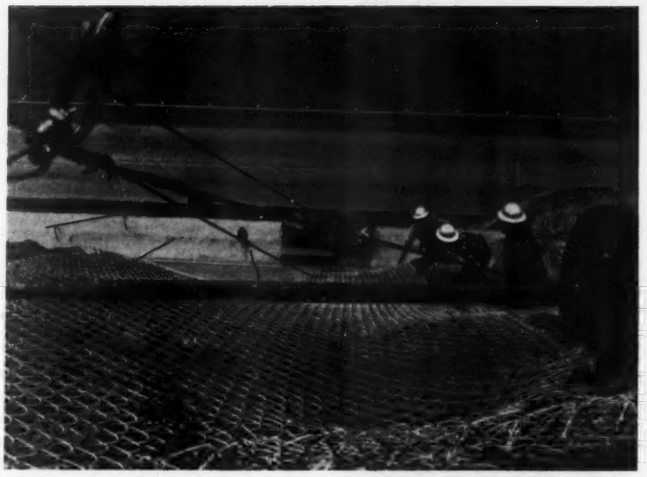
Wire Mesh Protects Rocky Road Slopes

Traffic Protection Under 170-Foot Highway Slope Solved When Contractor Takes Difficult Task



The rigging for installing the wire mesh on the rocky slope bordering a highway near Kelso, Wash. Taking the photo was almost as dangerous as laying the mesh. The cameraman nearly stood on his head to get it. *Ray Day Photo*

• FIVE miles south of the junction of U. S. 99 and State Route 830 at Kelso, Wash., a dangerous but interesting roadside job was completed during the past summer. Now, motorists whizzing along the new 4-lane highway can be free from worry that loose rock will plunge down off the sheer 170-foot rock slope towering over the road. For this slope, amounting to over 8 acres in area, is covered with heavy wire mesh strong enough to stop anything but a major rock slide.

Erland & Blickle of Portland, Oreg., had the contract with the Washington State Highway Commission for this work. The job was unique in several respects, not the least of which was the fact that similar work had been done only once before in the state—at Port Angeles. With the barest previous experience to go on, the company bid $28,890 to cover the slope with state-furnished mesh and cable.

The section of slope covered is 2,700 feet long. Slope characteristics range from vertical to a 1¼-to-1, with heights from 70 to 190 feet. Sheer walls in the deep cut were necessary when contractors built the new highway over three years ago, because flattened slopes in this formation would have cost too much money and would have interfered with an older secondary highway which skirts the top of the bank. The cut was made through unstable conglomerate and shale. During wet weather especially, big chunks of this rock ravel off and used to hurtle down the slope toward cars on the highway. The slope became too dangerous without some mechanical protection.

Cover Design

The covering mesh which Erland & Blickle placed is similar to the one previously installed in another part of the state. It consists of a well anchored blanket of No. 9-gage wire mesh laid over the slope. Forty-three rolls of 2-inch mesh left over from the Port Angeles job were used at Kelso, and the remainder of the material is 4-inch mesh, supplied in 50-foot rolls 12 feet wide by San Jose Steel Co., San Jose, Calif.

The material was fastened with a continuous course of No. 9 wire along the top to a heavy longitudinal cable, composed of old galvanized guardrail cable gathered up by the state maintenance forces. The courses of mesh, lapped about 1 foot, are also laced together vertically down the slope with No. 9 wire. In addition, vertical cables every 25 feet leading down the slope help to stiffen the wire mat and make it strong. These cables terminate either in deadmen sunk into the top ground above the slope, or in ⅝-inch steel anchor rods at least 4 feet long, drilled and grouted in rock. These vertical cables support the longitudinal upper cable and the weight of the wire mesh. The bottom end of the mat is about 20 feet above the road, and is fairly loose to let loose rock sift down safely to a drainage ditch close to the pavement, where maintenance men can remove it. The mat was designed, however, to intercept and hold much of the loose

"For TOUGH JOBS... No Other Oil can match

Sinclair SUPER TENOL"

...Elvin L. Jones, Supt. of Maintenance
Standard Sand and Silica Company

The Standard Sand and Silica Company of Davenport, Florida, mines 2,000 tons of sand a day, six days a week. Its products are used in concrete, masonry work and in sandblasting ships, buildings and railroad equipment.

One of the main pieces of equipment is a Super C Tournadozer. Mr. Elvin L. Jones, Supt. of Maintenance says that "Sinclair SUPER TENOL® is giving *superior service* in this machine. When it comes to tough jobs... there's not another oil on the market that can match SUPER TENOL."

He continues, "SUPER TENOL has also been used in our G.M. 6-71 diesel for 18 months. One third of the time, this machine operated 24 hours a day... *and we haven't spent a single penny for maintenance.*"

To find out how Sinclair Products can help you cut maintenance costs and keep production in high gear, call your local Sinclair Representative or write to Sinclair Refining Company, 600 Fifth Avenue, New York 20, N. Y.

SINCLAIR SUPER TENOL
...for YOUR Tough Jobs

material right on the slope. The total slope area is 382,000 square feet.

How Work Was Done

The actual installation of the mesh protection was an interesting combination of woodsmanship, rigging ability, high climbing, and poison-oak battles. This weed is prevalent all over the site, and its effect was bad enough to put one of the state men in the hospital for ten days. Ironically, in spite of the danger from falling rock and high climbing, this had been the only lost-time accident when the job was visited—at a time when it was more than 50 per cent complete.

First of all operations was a preliminary clearing of anchor sites, and the installation of either deadmen or drilled anchor rods. An Ingersoll-Rand portable compressor and a JB-55 Jackhamer were used for drilling the holes in rock. Rolls of anchor cable and mesh were trucked in, and the top longitudinal cable was placed lengthwise across the top of the slope.

Two rigs were used to maneuver each course of wire mesh into position. Working from the highway at the bottom of the slope was an International truck with a 2-drum American hoist, driven by a Minneapolis-Moline gas engine. This rig's operator did all the hoisting and maneuvering. At the top of the slope, working from the old highway, was a winch truck with a stubby boom. This truck's job was to hold the upper rigging block in the setup. Approximately half the length of the job was inaccessible from this road, however, so the inaccessible portion had to be handled by a small portable A-frame, made of pipe, and spudded into the rock with jackhammer holes and steel. The apex of the A-frame also had to be supported by holdback lines fastened to the nearby trees which overhang the top of the slope.

The first scheme for raising a course of wire mesh consisted of fastening the wire to a straight strongback. Protruding rocks and uneven spots made this unsuccessful, because the strongback was always hanging up. When 6.50 x 16 rubber-tired wheels were mounted on the strongback so it would roll, it worked like a charm.

To hoist a course of wire, the mesh was fastened to the strongback with No. 9 wire. The hoist operator then started the material up the slope from the highway at its base. When about 50 feet of wire

From the highway, the bank-protection operation looked like this. *Ray Day Photo*

was in the air, another roll was joined to the first by butting the ends together and threading foot-long lengths of No. 9 annealed connector wire. This process was then continued until the upper edge reached the longitudinal cables and was tied off. The edges were then tied with galvanized hog rings at 18-inch spacing.

In spite of protruding rocks and all kinds of danger, the work went ahead rapidly and safely. There were no lost-time accidents at all to contractor's personnel. The best shift covered 110 linear feet of slope which was 180 feet high. The crew was composed of a superintendent, 2 laborers, 2 operators, and 7 crew members classed as ironworkers who climbed around on the mesh and laced it together as the courses were installed.

Personnel

Field operations were supervised for Erland & Blickle by Superintendent W. F. Martin, assisted by C. W. Wells. L. S. Snyder is Resident Engineer. The job was administered out of Vancouver, District 4, with P. J. McKay as District Engineer. E. C. Simpson was Construction Engineer in general charge of the work.

Washington Roadsides Difficult

This project illustrates one of Washington's bad roadside problems, for rocky slopes which slough off in bad weather are prevalent throughout the mountainous western part of the state along the coast. In fact, Washington's roadside problems are so difficult and numerous that the State is one of the leaders in erosion prevention, construction of roadside marks, and the reduction of maintenance costs through roadside work. One of the latest roadside methods consists of a legal device: easements to make possible construction of public parks along the more scenic highways.

In the Kelso case, a roadside contract under $30,000 saved enormous expense of rock excavation. And it is believed by project officials that the heavy galvanized-wire mat will protect the traffic below for about as long as the highway will serve the 8,000 annual daily traffic count now on that important north-south route.

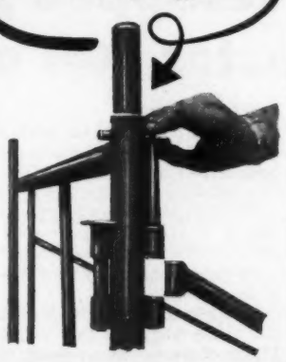
Kuljian Vice President

Arthur H. Kuljian, Chief Mechanical Engineer, has been elected Vice President in Charge of Engineering for the Kuljian Corp., Philadelphia, Pa., engineer and constructor. He has had wide experience in the design and engineering of steam-electric power stations, industrial plants, boiler-house extensions, and chemical plants, both in this country and abroad.

Easier-Faster New SPEEDPIN Scaffold

Obsoletes All Other Types of Scaffolds

THE SPEEDPIN CONNECTION Makes the Big Difference!



● Here's the newest, safest, most efficient scaffold on the market today. The Hagan Speedpin Tubular Steel Scaffold goes up fast . . . is easy to erect . . . cuts job costs because of its simple basic design, unusual flexibility, and great strength. With all-welded construction throughout, it has no loseable parts or pins—gives you easier, neater storage and stacking. And the patented Speedpin Connection insures faster assembling than any other method! Write today.

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THE GREATEST SERVICE ORGANIZATION OF ITS KIND IN THE WORLD . . .

Near you there is a Briggs & Stratton service organization — factory trained and supervised — ready to tune up, repair, or even rebuild your Briggs & Stratton engines with *original* Briggs & Stratton parts.

If your Briggs & Stratton engines are not busy during these winter months, now is the ideal time to have them serviced — to insure continued peak performance for busy periods ahead.

Only Briggs & Stratton maintains such complete world-wide authorized service facilities — a big "plus" that you get only when you specify Briggs & Stratton engines on the gasoline powered equipment you buy.

Briggs & Stratton Corporation, Milwaukee 1, Wisconsin, U. S. A.

In the automotive field Briggs & Stratton is the recognized leader and world's largest producer of locks, keys and related equipment.

Improved Router Line

An improved group of Speedmatic portable electric tools featuring one interchangeable motor has been announced by the Porter-Cable Machine Co., 1714 N. Salina St., Syracuse, N. Y. The machines include two routers, a plane, and a lock mortiser.

The router is used with an assortment of bits and cutters for grooving, veining, shaping, molding, coving, rabbeting, and dadoing. There are two models: the 511 standard model, rated at 8 amp, which idles at 22,000 rpm and weighs 8¾ pounds; and the 514 heavy-duty model which is rated at 12 amp, idles at 20,000 rpm, and weighs 18 pounds.

A new air exhaust system passes an unusually large volume of air through the router in order to cool it when used under heavy loads or in continuous production. The machine has a patented Depth Dial for adjusting the required cutting depth, and long spiral grooves in the base for rapid precision settings.

The Model 512 electric plane uses the interchangeable power unit from the 511 router and a special plane cutter is inserted in place of the router bit. The plane cutter has removable 2-edged reversible blades. A sharpening attachment is standard

The Model 512 electric plane.

equipment, and can be attached to the same power unit for resharpening the plane cutter in five minutes, the company says. The plane removes up to 3/32 inch of stock at a single pass, producing a smooth surface that requires no further finishing. Cutting depth is set directly by a thumb lever, which can be varied while the plane is in operation. A right-angle fence guide can be set for angles up to 30 degrees for cutting bevels. Maximum width of cut is 2 7/16 inches. Plane with motor weighs 21 pounds.

The Model 513 lock-mortising machine, when mounted on a door, is said to cut out a precision-fit recess for the lock box in 30 seconds. A templet is then used with the router to cut the recess for the face plate.

A number of accessories are available: a stair templet; a paneling gage; a hinge-butt templet; and a spring-loaded corner chisel. There are also 175 bits and cutters from which to choose.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 341.

Handbook on Steel Line

A comprehensive handbook on its line of tool and special-purpose steels is available from Pyramid Steel Co., P. O. Box 1226, Cleveland 3, Ohio.

It illustrates and describes steels for complete maintenance and repair purposes. Included are nontempering steel, pneumatic and shock steel, turned-ground and polished shafting steel, various types of heat-treated alloy steels, brake die steel, oil-hardening die steel, and abrasive-resisting plates. The booklet also covers steel for rebuilding worn crawler grousers and for filler-bar applications.

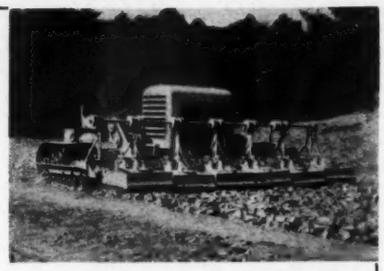
The handbook includes welding instructions for maintenance applications, tables and useful information on steel-hardness numbers, plus approximate-hardness conversion numbers for steel. Another section gives technical data such as decimal equivalents.

The 22-page booklet contains detailed specifications, applications, operating instructions, and other technical information.

This literature may be obtained from the company, or by using the Request Card at page 18. Circle No. 252.

VIBRO-TAMPER

SPEEDS SINGLE-COURSE MACADAM CONSTRUCTION



The International Vibro-Tamper makes possible one course macadam construction by applying vibration and tamping impact. Denser, better-keyed base courses result from the elimination of the unkeyed plane between layers found in conventional two or three layer construction.

Three or four passes of the machine compact as much as 12" of loose aggregate.

The single course construction saves much time in handling of materials, spreading and rolling.

In waterbound construction, the Vibro-Tamper "runs in" screenings with as little as two passes resulting in as much as 50% reduction of spreading, brooming and rolling time.

APPROVED BY U.S. NAVY, C.A.A. AND MANY STATE HIGHWAY DEPTS.

THE INTERNATIONAL VIBRATION COMPANY
16702 WATERLOO RD. CLEVELAND 10, OHIO

B.F.Goodrich

Partner C. A. Schwope and Gen. Supt. O. D. Pierce of Schwope Bros. examine a BFG tire.

Tires can be recapped 2 and 3 times—save contractor 30% on tire costs!

MORE than 70 trucks, tractors, shovels, scrapers and other units are used for earth moving and construction work by Schwope Brothers, San Antonio, Texas. The picture shows one of the company's machines at work on the San Jacinto Dam project, where a wilderness is being converted into a five to six thousand foot reservoir to serve Houston's water needs.

You'd expect rugged operations like this to shorten tire life greatly. Yet the B. F. Goodrich Universal tires above have rolled three years without ever being off the rim! And Schwope Bros. gets similar service from all its BFG tires: over 65,000 miles—and still going strong—on units hauling heavy construction equipment; more than 8,000 hours on off-the-road machinery.

Even after service like this the company is still able to recap BFG tires two and three times for a 30% saving on tire costs. No wonder Schwope Bros. uses B. F. Goodrich tires exclusively and Partner C. A. Schwope says they "often represent the difference between profit and loss".

The patented nylon shock shield is the reason why BFG tires cut costs. Layers of strong, elastic nylon cords stretch together under impact to protect the tire body from smashing shocks and bruises. This nylon shock shield saves you money 4 ways:

(1) more recappable tires and more hours of service per recap (2) increased original hours of service (3) greater bruise resistance (4) less danger of tread separation. The exclusive shock shield—which costs you nothing extra—is built into all tires of 8 or more plies. *Double* shield in larger sizes.

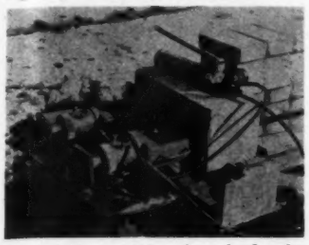
B. F. Goodrich makes a complete line of money-saving off-the-road tires. See them at your BFG retailer's store. You'll find the address under Tires in the Yellow Pages of your phone book. *The B. F. Goodrich Company, Akron, O.*

RESEARCH KEEPS B.F.Goodrich FIRST IN RUBBER

CONTRACTORS AND ENGINEERS

Center-Hole Ram Speeds Prestressing

A new application for the Re-Mo-Trol jack has been announced by Templeton, Kenly & Co., 1020 S. Central Ave., Chicago 44, Ill. The remote-controlled hydraulic puller is said to speed and simplify tensioning of prestressing rods and cables.



The unit consists of a hydraulic ram, with a hole passing through the center of the ram plunger, connected by a flexible high-pressure hose to the pump, which may be located 6 or more feet away from the ram. The pump may be equipped with a gage reading directly in ton-pull to insure accurate tensioning.

The center hole of the ram makes it possible to pass the prestressing rods through the ram, thus giving a straight-line torque-free pull. Two Re-Mo-Trol rams can be connected to a single pump for equal simultaneous tensioning of rods on either side of a concrete block member. The only accessories used are washers and simple chairs that permit clamping of the rods after tensioning. There is no heavy awkward yoke to be positioned and balanced in attempting to get equal tension on the rods. Cables are tensioned similarly, with the strands clamped in a wedge fitting.

Simplex hydraulic rams are available in 7 models—4 with the center hole—in capacities from 10 to 100 tons. Pumps come in 54-cubic-inch and 126-cubic-inch oil capacities.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 342.

Two Plastic Pipes

Two types of plastic pipe, flexible and semirigid, are being produced by Plastic Products Division, Triangle Conduit & Cable Co., Inc., New Brunswick, N. J. Flexible plastic pipe is available in non-toxic, industrial, and suction types. All three are made of Polyethylene. The nontoxic type is made in sizes ½ to 6 inches and all sizes up to 3 inches are available in coiled form. Features include light weight; flexibility; smooth interior for greater flow; and resistance to rot, rust, and electrolytic action, the company claims. The pipe may be used for jet-well installations. The industrial type has the same characteristics as the nontoxic and may be used for sewage. The suction type, available in sizes 2 through 6 inches, is designed for higher pressures in the larger sizes.

Triangle flexible-type plastic pipe.

The semirigid plastic pipe is made of Butyrate and is available in ½ through 6 inches in 20-foot lengths with one coupling cemented. This type is flexible enough to follow ditching contours, yet its impact strength eliminates special care in backfilling. Its chemical resistance and its resistance to rust, rot, and electrolytic action also make it acceptable for irrigation and draining systems, and jet wells.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 343.

Portable Air Heater

A new portable oil-fired air heater has been put on the market by Arthur C. Baumann, 7011-21 Grays Ave., Philadelphia 42, Pa. It delivers 375,000 Btu at 2.75 gph. It is suitable for cold-weather jobs such as drying plaster, paint, and concrete and for space heating. It also can be used to preheat engines and equipment.

The Eco-Temp Super air heater weighs 325 pounds. It is 35 inches high, 64 inches long, and 24 inches wide. Mounted on semipneumatic rubber-tired wheels, the unit is movable. It has a hook on top for lifting from floor to floor. The unit comes equipped with a thermostat for automatic operation.

The air heater burns No. 2 fuel oil and uses 110 volts, 60 cycles, single-phase. It has a heavy-gage steel body and a stainless-steel combustion chamber. A drum stores on-the-job fuel.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 312.

PLAN NOW TO GET AN

Adams TraveLoader

Loads with equal speed and efficiency from both windrows and stockpiles

● For high-speed loading, at low cost—from either windrows or stockpiles—you'll find the *All-Purpose* Adams TraveLoader in a class by itself.

On road and street jobs, the TraveLoader picks up and loads surplus windrowed material—dirt, sod, scarified material, snow, etc.—at better than a truck-a-minute clip . . . and does it without interrupting regular flow of traffic.

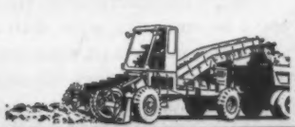
The TraveLoader handles stockpile loading with equal speed and efficiency, whatever the material—gravel, sand, crushed stone, slag, etc. . . . sends trucks on their way in jig time with full, well-balanced loads.

The TraveLoader's superior performance stems from a host of advanced features, such as **High-Speed, Full-Floating Feeder—Adjustable Conveyor—High, Centrally-Located Cab—Wide Range of Working Speeds.**

Ask your Adams dealer to show you how the TraveLoader will step up production and cut costs on your jobs.

J. D. ADAMS MANUFACTURING CO. • INDIANAPOLIS, IND.

ADAMS



Motor Graders TraveLoaders Pull-Type Graders

BAER DRAGLINES

cast-fabricated ⅜ to 6 yards°

Hitch plate, side plate, and trunnion bracket are cast or welded into one piece to guarantee strength on stressed sidewalls. Rolled alloy or cast lips are faired for fast loading. Digging angle may be adjusted by turning hitch shackle.

- BAER SHOVEL BUCKETS
- BAER HOE BUCKETS
- BAER ROOTER STANDARDS
- BAER BLADES & END BITS

BAER REPLACEABLE BUCKET TEETH

Baer replaceable bucket teeth will cut your digging costs on any job on any adaptable bucket. This claim stands — regardless of the teeth you are now using.

Write today for full details and literature

BAER **Steel Products, Inc.**

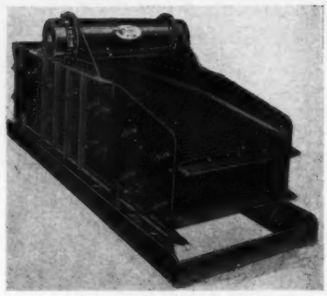
Auburn, Washington, U. S. A.

Heavy-Duty Scalper

A heavy-duty scalping screen with interchangeable vibrating mechanism is made by Deister Machine Co., 1933 E. Wayne St., Fort Wayne 4, Ind.

The UHS screen features an opposed-elliptical-throw action which controls the movement of material. The path of travel at any point on the surface of the screen cloth nearer the feed end takes the form of an ellipse, which revolves and leans toward the discharge end of the screen. As the discharge end is approached and the surface of the cloth takes a steeper slope, the elliptical path leans back toward the feed end. This action is said to speed and improve sizing.

Advantages of the elliptical throw begin at the input end, where the material is thrown to the discharge end to increase stratification of the



load directly under the input chute. Near the center of the screen, the elliptical throw becomes a circular throw, bouncing material up and down for stratification efficiency. Below the center, the elliptical throw reverses to a holding action, thus retaining the thinned bed of coarser material on the screen long enough to permit maximum grading.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 344.

Booklet on Trailer Home

A catalog on the New Moon trailer home has been released by the Redman Trailer Co., 56 Bridge St., Alma, Mich. Color illustrations and floor plans give details on four available models.

The trailer is equipped to approximate the living facilities of an apartment. All four models include a living room, one or two bedrooms, a bathroom, and kitchen. A studio couch, end tables, Venetian blinds, and drapes are basic furnishings for the living room. Bedrooms are equipped with double, twin, or bunk beds. Efficiency kitchens have a 6-foot refrigerator, twin sink, electric water heater, and counter and cabinet space. An occasional table can be transformed into a dining table for seven.

Bathrooms are available with tub and/or shower. A lavatory, toilet, and medium cabinet make the room a complete bathroom unit.

Heating is by thermostat-controlled oil furnace. Vents along both sides of the trailer afford cross ventilation.

Construction features include built-up steel chassis, duo or tandem wheel assembly, complete fiber-glass insulation, and triple-trapped enclosed plumbing.

This literature may be obtained from the company, or by using the Request Card at page 18. Circle No. 313.

Waukesha Manager Honored

Max Hoffman, Manager of Waukesha Motor Western Ltd., recently organized by Waukesha Motor Co., Waukesha, Wis., has been awarded an honorary membership in the Asociacion Mexicana De Importadores De Maquinaria, A. C. (Association of Machinery Importers of Mexico). The membership was an expression of esteem and gratitude for his active assistance to the Association. More than 30 United States and Canadian manufacturers attended the Inaugural Session of the Association, which was featured by the membership-award ceremony.

Waukesha Motor Western Ltd. transacts Waukesha Motor Co. sales in Western Hemisphere countries.

1. CMC Transcrete Truck Mixer
2. Burro Railroad Crane
3. Haiss Loader
4. Schield Bantam Truck-Mounted Back Hoe
5. Meili Blumberg Grader
6. Johnson Cement Elevating Charger
7. Foote Adnun Black Top Paver
8. Eagle Screw Washer-Dewaterer

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DIAMOND ROLLER CHAINS?

Leading manufacturers of construction machinery have found by years of experience that Diamond Roller Chain Drives provide the trouble-free, long life performance vital to building and keeping a high reputation.

Versatile as the machinery itself, Diamond Roller Chains serve on engine to main shaft drives, shaft to shaft or many shafts, and conveyor drives with equally high efficiency and long-life economy.

That is why the question, "Are the drives Diamond Roller Chains?" should always be asked. It is also why the answer is so often "Yes".

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DIAMOND ROLLER CHAINS

Two-Bridge Contract On Track Relocation

Reinforced-Concrete Piers and Abutments for Ballast-Deck Bridges To Permit Faster Train Speeds on Rock Island RR

By L. H. HOUCK

• THE main-line track relocation of the Chicago, Rock Island and Pacific Railroad Company between Atlantic and Council Bluffs, Iowa, is the major item in the company's 1952 expansion program. (For an account of the grading on this job, see C. & E. Nov., 1952, pg. 30.)

This article relates specifically to the concrete piers and abutments for the many bridges, and more particularly to the contract of the List & Weatherly Construction Co., of Kansas City, Mo., for two jobs in the 13-mile section from Graybill Creek west to Middle Silver Creek.

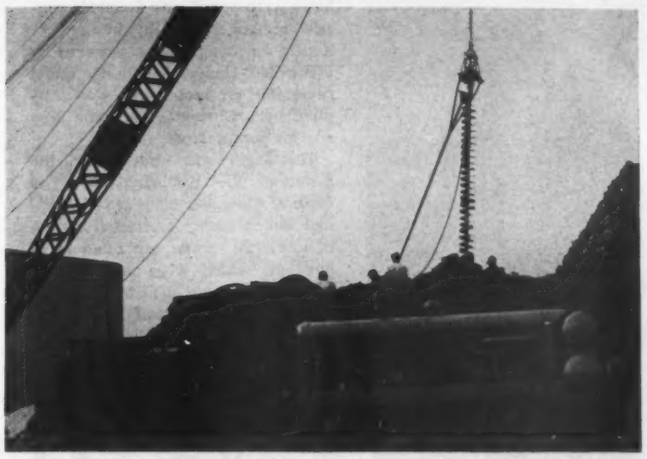
The contractor was fortunate in having the topography in his favor, which placed the two jobs only half a mile apart, and as a result the men made good time by working on both jobs at the same time. For instance they had two boiler setups to supply steam for pile drivers at both locations.

The Rock Island quite understandably measures everything west of Chicago in miles and fractions of track, and List & Weatherly starts in at Mile 458.9 with piers and abutments for a bridge that passes the new track over U. S. 59 and one set of railroad tracks known as the Carson Branch Line. This bridge will consist of one 46-foot span and four 40-foot spans, requiring four piers and two abutments. Steel and roadbed contracts will be let separately by the railroad company.

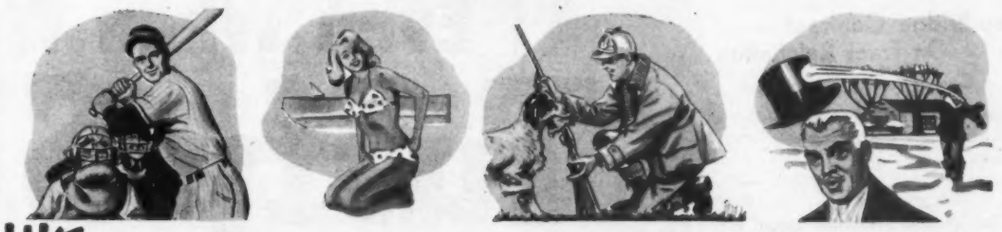
List & Weatherly's second job is located at Mile 459.4, where abutments and piers are being built for a bridge across the Nishnabotna River. This bridge will consist of four 90-foot girders and one 100-foot girder supported by two abutments and four piers.

Both bridges will have ballast decks, which means that the rails will be put down on conventional wood ties ballasted and tamped with

(Continued on next page)



List & Weatherly pulls up a Ka-Mo 16-foot 14-inch auger for clearing. A Gardner-Denver 5-cylinder air motor spins the cuttings from the helix. A Chicago Pneumatic 320-cfm air compressor furnishes the air. The General Electric dc welding generator at left was used for welding 20-foot extensions to 30-foot tubes.



LIKE Spring and Baseball...Summer and Swimming...Autumn and Hunting...Winter and Snowballs

Yes, whether it's pulling a wet ditch, with the rear drivers up where the footing is good; or finishing a wide shoulder without leaving tire marks; or reaching out for a tremendous windrow and missing it with all wheels; or steering the rear wheels against the side thrust when widening out... whatever the season... whatever the job... All-Wheel Drive and All-Wheel Steer work together as a team... each making the other just that much more effective.

NO TWO WAYS ABOUT IT... an Austin-Western Power Grader goes places where ordinary motor graders cannot go... does things they cannot do... saves time and money on every job.

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these cost-reducing forms for concrete

Cost records from job after job prove that Economy's system of Form Engineering and Rental Service means substantial savings in TIME—MATERIAL—MONEY for GREATER PROFITS.

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ECONOMY METAL FORMS

A Koehring 605 drops a 30-foot Monotube pile into a prepared hole on the Rock Island RR job.

Two-Bridge Contract On Track Relocation

(Continued from preceding page)

gravel. This type of construction on straight lines permits faster train speeds.

Piling

The ground formation called for heavy piling support with boulders ranging from 10 to 50 feet below the surface. Excavation and test drilling disclosed many layers of alternate top soil and sand which had been deposited by prehistoric floods.

Thirteen 50-foot Monotube piles were driven under each abutment on the highway overhead crossing; thirty-eight 50-foot Monotubes for the abutments at the Nishnabotna River crossing; and 54 Monotubes 35-feet long for each of the river piers.

Piling was driven with a 50C Super-Vulcan steam hammer slung from the 70-foot boom of a Manitowoc 1¼-yard Speedcrane on the river job. Steam was supplied to the hammer from a 40-hp coal-fired upright boiler through a 2-inch pipe line throttled at the end of the iron pipe and into the flexible steamhose line leading to the hammer.

Two separate outfits of crane, steam boiler and steam hammer were set up for driving piling simultaneously at the highway-crossing and river-crossing jobs. The crane used on the highway crossing was a 1½-yard Koehring No. 605 with an 80-foot boom. A Super-Vulcan 50C was used on both jobs.

Monotube steel piling comes in standard lengths up to 30 feet. For longer piles extensions are welded on, and driving 50-foot or longer piles sometimes presents a problem in booming draglines, since there must be room under the boom and above the piling for the steam-hammer rigging.

George Davis, General Superintendent, solved the problem of gaining crane height on this job by allowing a 20-foot fill of a 40-foot total to be benched off at the abutment on the east end of the highway crossing. The Koehring 605 was set on this bench for driving the 50-footers nearest the highway.

Additional tube lengths were welded on as needed with a General Electric 300-amp welding unit. Spud holes were bored with a Ka-Mo air-powered auger, 14 inches in diameter and 16 feet long. It was powered by a Gardner-Denver 5-cylinder radial reversible air motor. Air was supplied by a Chicago Pneumatic 320-cfm air compressor.

The auger was rigged from the boom of the Koehring 605. The pitch of the auger made it self-feeding, but it was retracted from the hole by the crane for removal of cuttings, which were spun off by reversing the screw in the air. This machine was also used for starting holes for the treated-timber piling. Five-foot abutment piles are battered 2 inches in 12 inches—others vertical as near plumb as possible. Treated-timber piling was driven under all of the piers except the river piers—40 to the pier. River piers got 54 Monotubes 35 feet long.

Cofferdams of steel-sheet piling were required on the river piers. This interlocking steel was driven by a McKiernan-Terry 9-B-2 steam hammer and pulled, after the concrete was cured, by a Vulcan steam piling extractor. Cofferdams were dewatered with two 6-inch Gorman-Rupp pumps. Wet excavation inside cofferdams was accomplished with a crane and clamshell. Forms were built inside, and throughout pouring the dewatering pumps kept going.

Fill and embankments at the highway and other places where needed were held back by Armco wing wall steel. Concrete was vibrated with Chicago Pneumatic vibrators.

Concrete Mixing and Pouring

Concrete was mixed in a Koehring 4-bag mixer. Sand and gravel were received by railroad car on a job siding and were unloaded by crane and clamshell into a 3-bin 10-yard Johnson batcher as needed or stock-piled on the ground. Crushed rock was ground-piled in the 1½-inch

"Couldn't Kink Them, Even When We Tried," . . .

Tuffy Slings

Other Specialty Designed Tuffys For Special Uses

Tuffy SCRAPER ROPE

Created to stand up under stresses and strains imposed by wheeled scrapers. Flexible to withstand sharp bends . . . stiff enough to resist looping and kinking when slack.

Tuffy DRAGLINES

Finer construction techniques and toughened materials pay off in maximum abrasive resistance. Provides extra flexibility with no loss in quality . . . spools better and rides better on grooves. Sings down when cutting.

Tuffy DOZER ROPE

A special, tougher construction for tough dozer service on 190' reels for mounting on the tractor just back of the wedge socket. By feeding through only enough rope from the reel to replace section damaged on the drum, users report up to 300% savings in rope costs and half the down time.

Braided Construction Lets Tuffy Slings Straighten Out with No Damage

This Pennsylvania construction company owner proved to himself that Tuffy Slings are extra flexible, extra strong. He knows the patented, braided construction actively fights off knots and kinks . . . and after using Tuffy Slings for over a year, he knows they last longer under most rugged use!

Some stranded wire ropes may have the strength needed for sling work, but they are hard to handle and hitch because of their stiffness. Also, they're subject to kinking and material damage when bent around small radii.

When you use Tuffy Slings, you're sure of maximum flexibility *plus* strength, thanks to Tuffy's patented 9 part machine-braided wire fabric construction. The 9 parts are interlaced in an exclusive way that forms a fabric that can be repeatedly bent around abrupt corners. And even when one of the strands is cut or broken, there's no stranding!

* Name Furnished on Request

union Wire Rope corporation

Specialists in Wire Rope and Braided Wire Fabric

size and this was added to the mix at the rate of 30 per cent of the total.

A 1-yard Koehring 403 crane with a 70-foot boom was used for clamshell unloading and also, with 1-yard buckets, for pouring concrete.

The water supply for concrete was nearby. That is the way Davis put it, in stating that there was plenty of water 6 inches below the surface of the ground in this particular area. A wellpoint was put down and hooked up to one of the contractor's Gorman-Rupp direct-connected engine-driven pumps.

Sand and gravel were furnished by Lyman-Richey Sand & Gravel Corp., which loaded into the railroad cars. A second concrete mixer was set up near the batcher to increase the concrete production on the big pours. This was a ½-yard Smith. Re-usable forms were fabricated on the job from 2 x 4 and 2 x 6-inch framing and lined with ¼-inch plywood.

A representative pier measures 10 x 28 feet at the base and it is supported by an 18 x 31 reinforced-concrete footing poured on either steel Monotube or wooden piling. The height measured from footing to top is 39 feet and the top is 6 x 22 feet.

Other Concrete Contracts

Two other contractors figure prominently in the concrete work. They are the Iowa Bridge Co. and Alexander & Repass, both of Des Moines, Iowa.

In the 13-mile section of the 34.66-mile job with which this article is concerned, Alexander & Repass had completed three reinforced-concrete culverts in a contract which was started in the fall of '51 and carried on through the below-zero winter in order to speed the completion of the relocation. This contractor also built four timber overpasses.

The Iowa Bridge Company was responsible for four box culverts. Reinforced-concrete construction was essentially the same for all the culverts except for dimensions. A representative one consisted of 700 yards of excavation and 652 cubic yards of concrete, and was reinforced with 101,510 pounds of 1-inch steel reinforcing bars.

A Vulcan pile extractor, slung to the boom of a Manitowoc Speedcrane, removes steel piling used for a cofferdam on one of the river crossings.

The right-of-way for the entire 34.66 length is fenced with steel posts and barbed wire.

The work on the 34.66 miles of track relocation began in the fall of 1951. It will reduce the present track mileage of 59.28 between Atlantic and Council Bluffs to 49.08 miles and allow for the use of a short stretch of Chicago Great Western trackage south from McClelland, Iowa. The new track will make a sharp reduction in curves. Railroad civil engineers said the old line, adding the curves, contained 5.76 complete circles.

The Iowa section of the line in the track relocation is designed to break up a bottleneck in speeding up traffic, and every effort is being made to complete the job by late spring of 1953.

Quantities and Personnel

Items on List & Weatherly's two jobs amounted to:

Excavation	1,794 cu. yds.
Concrete	1,692 cu. yds.
Reinforcing steel	49,050 lbs.
Steel piling for cofferdams	11,900 sq. ft.

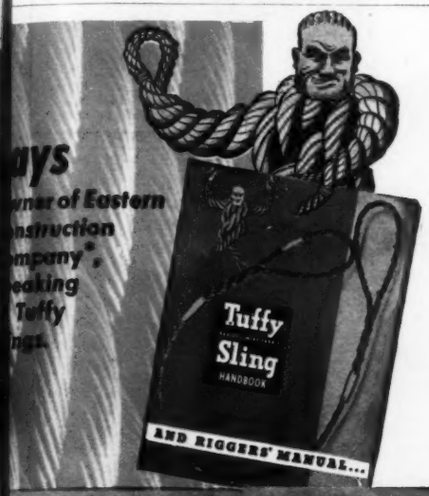
The dry-weight formula used was:

Gravel	320 lbs.
Sand	210 lbs.
Portland Cement	94 lbs.

For List & Weatherly, George Davis is General Superintendent. Chicago, Rock Island and Pacific Railroad Co. civil engineers directly connected with the job are: W. B. Throckmorton, Chief Engineer; J. F. Marsh, Bridge Engineer; W. E. Simpson, Construction Engineer, with job headquarters at Atlantic, Iowa; L. Q. Hill, K. E. Gregory, and H. E. Strate, Resident Engineers.

Oklahoma Highway Changes

Carl M. LaGere has been appointed Commissioner of the Oklahoma State Highway Commission to fill the unexpired term created by the death of Robert Biles. Further changes are: Joe Curtis, former Vice Chairman to Chairman; J. I. Goins, former Secretary to Vice Chairman; and Julius W. Cox, Secretary.



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Contains plenty of factual, useful data on 12 braided sling types . . . various types of sling fittings, 30 illustrations of sling uses, information on splicing Tuffy Slings as well as Wire Rope. It's the only handbook of its kind in the braided sling field, and it's yours for the asking! Get your free copy of the new Tuffy Sling Handbook . . . mail the coupon below *today!*

On jobs like this one, where loops, knots, kinks and jerks are liable to occur, the braided construction of Tuffy Slings prevents damage.

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Please send my FREE copy of the new Tuffy Sling Handbook and Rigger's Manual.

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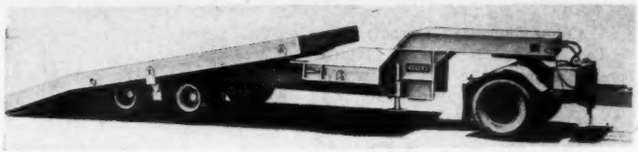
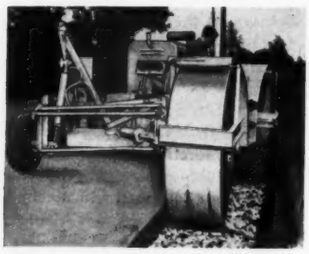


This new gooseneck trailer features a divided deck that can be tipped by one man. A hydraulic ram cushions deck movement. Further information may be secured from Rogers Bros. Corp., Albion, Pa. Or use the Request Card at page 18. Circle No. 333.

Adjustable Wheels Vary Trench-Roller Compaction Width

A new trench roller that adjusts its rolls back and forth to give a variable compaction width has been announced by the All-Purpose Spreader Co., P. O. Box 105, Elyria, Ohio. A lever-controlled valve moves either of the machine's two compression rolls laterally, providing rolling surface from 20 to 39 inches wide. Any roll within that range can be made in one pass. In tandem the two rollers give double compression over a 20-inch width.



Both of the 60-inch-diameter rolls are driven by differential drive. Each roll has separate hydraulic brakes and each steers independently. With greater over-all traction the machine can get in and out of a trench and does not need to be towed over the top of a steep hill. A compensating leveling wheel, hydraulically raised or lowered, steers in conjunction with each of the two compression rolls. The unit has a 60-gallon water tank with sprinkling system. Electric pump with electric starter, generator, battery, and governor are included.

There are two speeds forward and two reverse, with a low and high of 1.62 mph and 5.55 mph. The roller exerts a pressure of 250 pounds per linear inch without water ballast and up to 345 pounds with full ballast. Maximum rolling depth is 24 inches.

The operator is seated so that he can always see the edge of the pavement, as well as both compression rolls, and can see ahead no matter in which direction he is working. For his comfort, the fan blades in the engine back of the seat are reversed to blow the hot air and dust away from him. All controls are within easy reach. Hydraulic steering allows the operator to position the compression rolls exactly where he wants them. There is no steering-wheel whiplash when steering wheels meet an obstruction, the manufacturer states.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 325.

PCA Opens Montana Office

The Portland Cement Association, a national service organization to improve and extend the uses of portland cement and concrete, has opened an office in Helena, Mont., to carry on its program of educational work, technical service, and promotion activities throughout Montana. The new office is located in Rooms 9-10, Gold Block.

Under the direction of District Engineer Jack Y. Barnes, this new district office—one of 27 similar field offices operated by PCA in the United States and Canada—will make freely available to cement and concrete users in Montana such services of the Association as: technical data, sound-and-color motion pictures, personal fieldwork, and the facilities of PCA's research and development laboratories.

Industrial-Tire Booklet

A 12-page industrial-tire guidebook has been released by The B. F. Goodrich Co., 500 S. Main St., Akron, Ohio. The booklet shows the complete Goodrich industrial-tire line, the service in which each tire should be used, and contains many useful maintenance tips on the care of industrial tires.

It also points out the advantages of the company's plan for tire and wheel analysis.

This literature may be obtained from the company, or by using the Request Card at page 18. Circle No. 345.

Use Swenson self-feeding material spreaders for fast, easy application of salt, chloride, sand, cinders, gravel or a combination of these materials

Free Information

Swenson Spreader & Mfg. Co.
Lindenwood, Illinois

Helping build America...

Hendrix DRAGLINE BUCKETS

3/8 to 40 Cubic Yards

A TYPE & SIZE FOR EVERY DIGGING PURPOSE

HENDRIX Lightweight DRAGLINE BUCKETS

Hendrix Buckets May Be Special Ordered WITHOUT PERFORATIONS

HENDRIX MANUFACTURING CO., INC.
MANSFIELD – LOUISIANA
CONTRACTORS AND ENGINEERS

Loader-Dozer Unit

A new combination for loading and dozing has been announced by the Oliver Corp., 400 W. Madison St., Chicago 6, Ill. The industrial wheel tractor with Strait-Line loader digs at either end, swings its load overhead, and loads in front. According to the manufacturer, the rear-carried bucket load multiplies traction and makes steering easier. The straight-line operation is said to save loading time.

With the angle-bulldozer blade mounted on the Strait-Line, all that is necessary is to push a lever and the tractor is ready for dozing. Carrying a loaded bucket in the rear is said to give added traction and make wheel-tractor dozing very effective.

The loader bucket may be removed from the Strait-Line unit and replaced with a crane which can operate at either end of the tractor. This unit may be used for handling pipe poles, heavy machinery, etc. The crane's ability to function at the rear is important where soft footing is encountered, the company says. It makes steering easier and allows use of the unit under conditions where a load in front would make operation impossible.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 346.

Business Course on Building Construction

New York University's Division of General Education is offering a new course during the spring semester. It is "Business Problems of Building Construction" and will be held on Mondays from 6:15 to 8 p. m., February 2 through May 25. Morris Liebeskind, professional engineer and Deputy Superintendent for the Bureau of Plant Operation and Maintenance, Board of Education, City of New York, will instruct the class. Some of the topics covered will be: advertising; taking of bids; relations among contractors; payments; interpretations and difficulties of specifications; and legal implications for contractors.

Information on this and other courses of interest to engineers and contractors may be obtained from the Division of General Education, 1 Washington Square North, New York 3, N. Y. Registration will be held at this address daily from noon to 8 p. m. and on Saturdays from 9:30 a. m. to 1 p. m., January 19 through February 6.

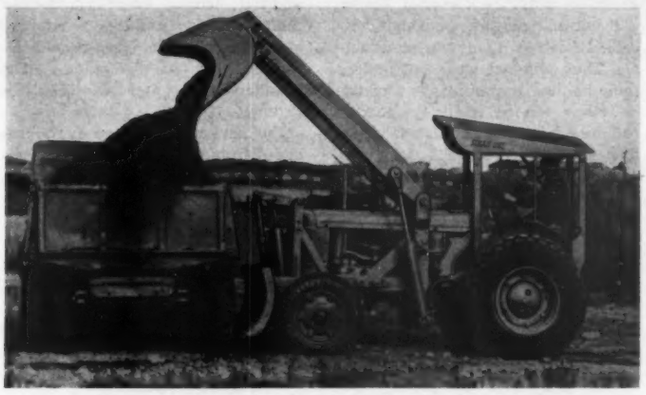
Portable Electric Tools

A 34-page catalog on portable electric drills, saws, and sanders is issued by Bradford Machine Tool Co., 657 Evans St., Cincinnati 4, Ohio.

Drills range from ¼ inch to 1 inch in steel and ½ inch to 3 inches in hardwood. They have a cast-aluminum housing, pistol-grip-type handle, and 3-conductor rubber-covered cable.

Saws with 6 and 8-inch blades are made for mitering, ripping and cross-cutting. Steel carrying cases and saw tables are also listed.

This literature may be obtained from the company by requesting Catalog No. 1-A, or by using the Request Card at page 18. Circle No. 347.



A push of a button converts this Oliver Strait-Line loader into a bulldozer.

Highway Trainee Jobs

Until February 10, the U. S. Civil Service Commission is considering applications for an examination to fill Highway Engineer Trainee jobs in the Bureau of Public Roads, U. S. Department of Commerce. Applicants must pass a written test, have the appropriate education or experience, and be from 18 to 35 years old. The jobs pay from $3,175 to $3,410 a year with periodic increases each year.

Further information and application forms may be obtained from most first and second-class post offices or from the U. S. Civil Service Commission, Washington 25, D. C.

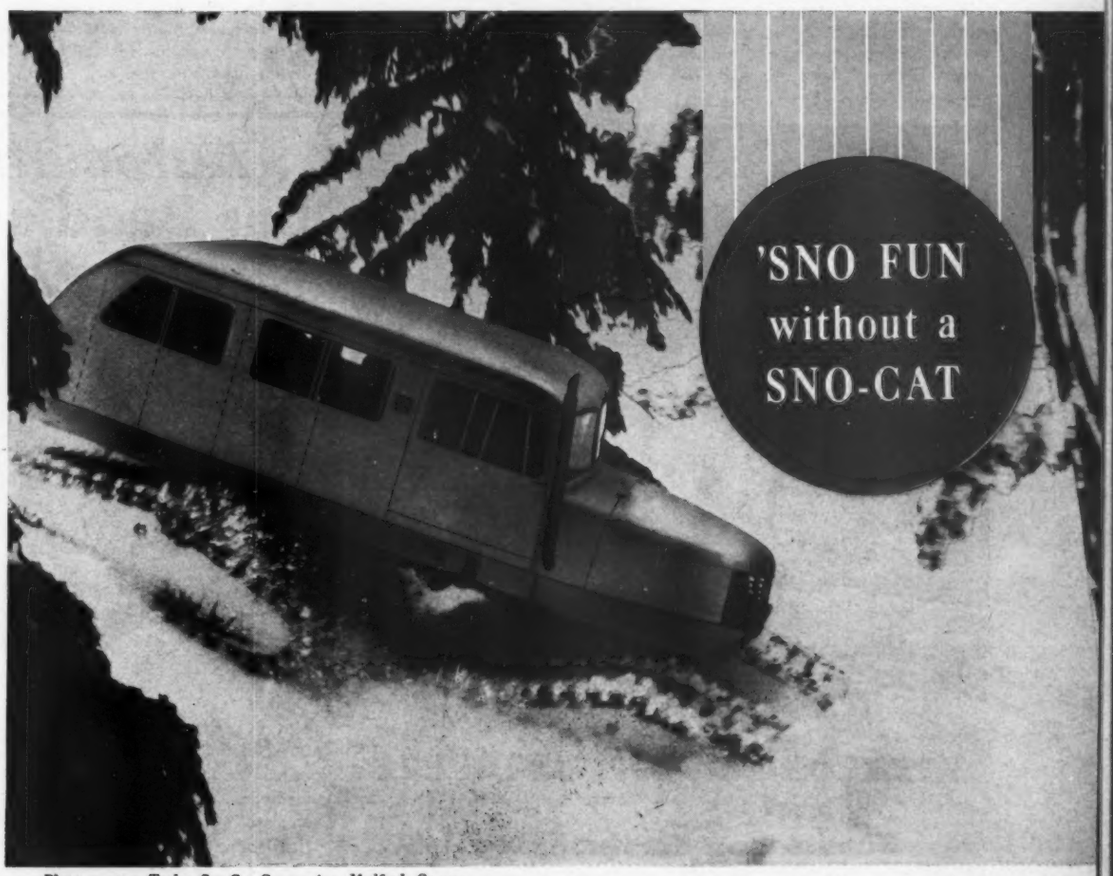


Photo courtesy Tucker Sno-Cat Corporation, Medford, Oregon

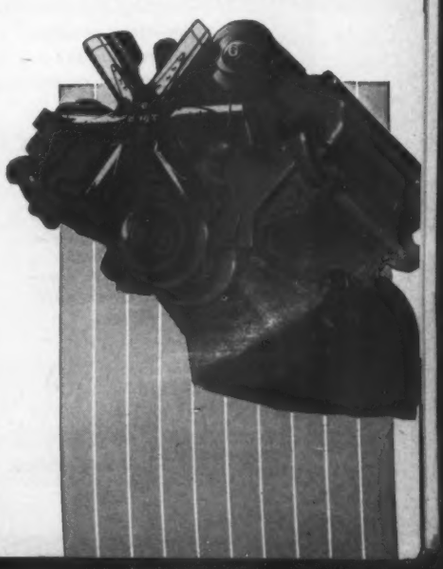
Snow, deep and powdery, on his favorite slope may be cause for rejoicing to the skier. But, to the men who must keep 60,000 volts of electricity crackling through ice-crusted lines in the high Sierras, to the men who must keep the lines of communication and transportation open to the West Coast . . . snow in any form spells possible trouble.

When the going is toughest, mountain men turn to their best friend, the Tucker Sno-Cat. These four-pontoon, full-track vehicles carry men and equipment *over the snow*—in minutes—to trouble spots it might otherwise take days to reach.

The 180 horsepower Model 20 Chrysler V-8 Industrial Engine gives the Sno-Cat extreme power without increase in weight, while Chrysler gyrol Fluid Drive and automatic transmission provide smoother, faster application of power to the double-drive axles. This combination is ideal for uses which require a powerful engine that will not stall under heavy loads and at the same time require an engine and transmission protected against the wear and tear of sudden starts and stops.

For greater power and economy in your equipment, check the two new Chrysler V-8 Industrial Engines as well as the seven six-cylinder models. See your Chrysler Industrial Engine Dealer for detailed information, or write: ***Dept. 81, Industrial Engine Division, Chrysler Corporation, Trenton, Michigan.***

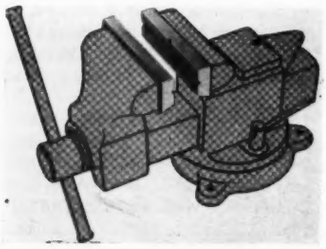
180 horses . . . man's best friend in the wintry high Sierras



CHRYSLER
Industrial Engines
HORSEPOWER WITH A PEDIGREE

Permanent Magnets in Soft Jaws for Vises

Magnetic soft jaws for vises are introduced by Magne-Grip Tool Co., 4900 W. Madison St., Chicago 44, Ill. They are said to hold securely and can be removed by simply lifting them off.



A two-way V-groove locks the work in, holding it in any position desired, regardless of size or shape. Magne-Grip soft jaws are made of an alloy that the company claims will not mar, scratch, or gouge delicate finishes or highly polished metals. They will not wear out or lose their holding power in years of use and they can be easily re-faced if required. Sizes range from 3 to 4½ inches.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 348.

New Snow-Plow Wax

A snow-plow wax for both brush and spray application has been announced by Speco, Inc., 7308 Associate Ave., Cleveland 9, Ohio. Snow-Rem Universal is said to eliminate the necessity for thinning ordinary waxes for spray use or for stocking both spray and brush wax.

It possesses a high Carnauba content and also includes a new silicone additive which, according to the manufacturer, produces a slippery surface coating and possesses adhering qualities. It is available in 1 and 5-gallon cans and in 55-gallon drums.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 271.

How to Make the Most Of Engineering Manpower

Most American industrial companies are not getting the best "mileage" from their engineering staffs. A report—"How to Improve the Utilization of Engineering Manpower"—recently published by the National Society of Professional Engineers describes how almost 500 companies employing engineers are meeting this problem in the face of the engineer shortage.

Based on a nation-wide survey, the report points out that industry could use engineers more effectively by analyzing staff assignments and by standardizing and simplifying many routine engineering jobs so that they could be done by supporting personnel. This would leave the engineers free to concentrate on creative work. The report discusses methods of improving engineer utilization, including two utilization checklists; the use of supporting personnel; the causes and results of engineering turnover; and other topics of benefit to industrial employers of engineers and the engineering profession.

The handy-sized, 55-page booklet may be obtained from the Society's national headquarters at 1121 15th St., N. W., Washington 5, D. C., at $2.00 for single copies.

Conventions are listed on page 81.

ANOTHER GW PRODUCT

GarWood

TRACTOR-DRAWN SCRAPERS

Handle Any Earthmoving Job...

Here's Why Gar Wood gives you a complete line of tractor-drawn four-wheel scrapers. Each one is built to "take the works" in the toughest going—give faster digging, faster dumping and greater accuracy . . . WIDE CUTTING EDGES let you use power where it counts—moves material back in pan easier . . . LIVE BOILING ACTION gives full heaping load every trip at less cost per yard . . . FORCED EJECTION and large apron opening gives faster dumping and controlled spreading—so accurate that you can often finegrade! . . . CENTER LINE SHEAVES mean far longer cable life . . . Optional tire sizes available to meet all flotation requirements on any job.

GAR WOOD CABLE CONTROLS

Model 281, double-drum unit, gives maximum scraper accuracy. Planetary gearing makes cable drum more sensitive to smallest variations in control levers. Easy to operate, adjust, service and maintain.

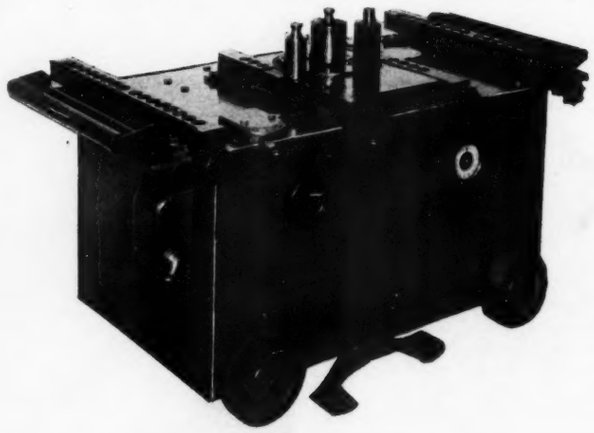
GAR WOOD INDUSTRIES

GAR WOOD INDUSTRIES, INC.

Findlay Division • Executive Offices • Wayne, Michigan

F-236

Automatic . . . Bar Bending Machine



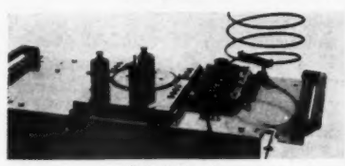
This new Bending Machine features all the latest improvements called for in modern fabricating methods. Right and left-hand bends can be made without additional adjustment by means of a single control lever.

The variable speed drive is easily adjustable to suit any thickness of material assuring high operating efficiency even when handling light stock.

Automatic stop and return control provides maximum safety and uniform work.

Special attachments permit the bending of hooks and angles on slab, truss or offset bars. Also will bend spirals, rings and curves of any diameter and pitch.

Stirrup Bend



Spiral Bend

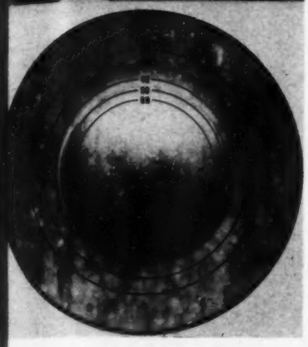
Large Double Bend

Multiple Double Bend

These machines will be on display at the Concrete Industries Exposition Cleveland—Booth No. 50

KLINGELHOFER MACHINE TOOL CO.

INDUSTRIAL PARK, KENILWORTH, NEW JERSEY



Tests Steel Hardness

A new pocket-sized tester for determining the hardness of steel alloys and other metals from 25 to 65 Rockwell "C" scale is announced by Pacific Transducer Corp., 11921 W. Pico Blvd., Los Angeles 64, Calif. It is a direct reading device for testing specimens of steel alloy in almost any place or position. No further calculations are required.

The test includes a microball indentor, a measuring microscope, and a standard hardness-test block. An impact indentor drives a $\frac{1}{16}$-inch tungsten carbide ball a short distance into the sample to be tested. The diameter of the indentation is then measured by the reticulated microscope. As the diameter is a function of the hardness, the reticle indicates the hardness directly. It is accurate to the nearest 1½ points "C" scale.

The unit is said to be particularly adapted for testing all parts of large dies, punches, and large welds as well as for structural steel, tanks, and large pipes.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 349.

Salvage by Cofferdam

Salvage crews of Merritt-Chapman & Scott Corp., New York, N. Y., recently brought to the surface by cofferdam method the 1,003-ton suction dredge Lyons which sank while at anchor in the Arthur Kill off the Gulf Oil Co.'s plant at Gulfport, Staten Island. This method of salvage entails constructing on the ship's deck a watertight box-like structure, the top of which extends above the surface. Once the cofferdam is in place and all openings in the vessel's hull have been sealed, the ship can be pumped out, with its own buoyancy raising it to the surface.

The Lyons—130 feet long, 35 feet in the beam, and 10 feet deep, with a 2-story superstructure — had settled to the bottom in 21 feet of water. While a 120 x 37 x 22-foot timber cofferdam was being built, M-C&S dismantled the dredge's A-frame, suction ladder, and anything else that might interfere with the installation of the cofferdam, and raised the dismantled material to the surface by floating derricks. As sections of the cofferdam were completed, they were barged to the site, lowered into position by derrick, and bolted in place by divers. The divers also patched and plugged all openings in the hull outside the deck area covered by the cofferdam.

As soon as placement of the cofferdam was complete, pumping operations started to remove the water from inside the ship's hull and cofferdam. To guard against any tendency to capsize on the part of the Lyons, slings were run beneath its hull from the floating derricks Monarch and California. Holding the cables taut on either side, the derricks served to stabilize the dredge as it rose from the bottom.

After it was raised, the Lyons was moved to the M-C&S yard at Chelsea, Staten Island, for removal of the cofferdam. It was then taken to the Bushey Shipyard, Brooklyn, for drydocking.

Non-Agitating Truck Body

A non-agitating truck body that carries air-entrained concrete is the subject of a booklet issued by Maxon Construction Co., Talbott Bldg., Dayton 2, Ohio. In addition to technical specifications the folder uses photographs and diagrams to illustrate the advantages of this type of body.

The manufacturer points out that central-mix concrete is more uniform from load to load, and that in the Dumpcrete non-agitating truck body there is no chance of changing air content or slump by continued mixing on the way to the pour. Another feature is the clean discharge made possible by a vertical dumping angle.

The manufacturer also stresses the advantage in the convertibility of the unit from concrete to utility body by removal of the baffle and chute assembly. The entire gate assembly lifts out as a single unit.

This literature may be obtained from the company, or by using the Request Card at page 18. Circle No. 296.

...And, gets there under its own power!

To paraphrase the contractor on this tough job, Jim Wilson, Bridge Superintendent, Winston Bros. Company, Hollywood, California: "Each day we are finding more and more uses for our Schramm *Pneumatractor.*"

The Schramm *Pneumatractor* is a self-propelled, 105 c.f.m. compressor-tractor that not only provides savings by providing air for a complete assortment of construction tools, but will also PUSH... PULL... POWER... anything a wheel tractor will!

The versatile Schramm *Pneumatractor* offers many other advantages.

Write us for Bulletin Z50A showing number of tools that can be operated by the *Pneumatractor* and by the various size Schramm Air Compressors.

SCHRAMM, INC.

The Compressor People

WEST CHESTER • PENNSYLVANIA

SCHRAMM AIR COMPRESSORS

A SIZE AND MODEL FOR EVERY AIR NEED

New Modern School For U. S. Army Base

Three-Wing Classroom Areas and General-Purpose Room of Steel Frame Design With Prestressed Floor Slabs

Workmen place prestressed Flexicore floor slabs in a classroom area. *C. & E. Photo*

• CHILDREN at Fort Sill, Okla.—artillery center for the U. S. Army—got off to a really fresh start this school year. A new modern-design elementary school was ready for their use in September. Secor Building Co., Inc., of Oklahoma City, held the $481,131 contract for construction of the new educational unit on the base.

The structure has a low one-story outline covering an area 220 x 258 feet. Three parallel wings containing the 20 classrooms jut out from a central area containing the offices, library, kitchen, boiler-room, general-purpose room, and connecting corridors. The wings contain classrooms on both sides of a corridor leading down the center of each wing. The wings are 52 feet 7 inches wide and spread 45 feet apart. Two of them are 130 feet long, and the other is 156 feet. The ceilings peak at the center of the corridors, thereby giving a floor-to-ceiling height of 8¼ to 11½ feet across each of the wings. The classrooms are about 21 x 32 feet in size.

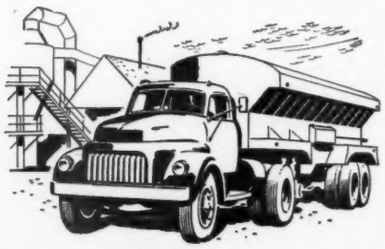
One of the special features of the new school is the large all-purpose room 114 x 52 feet in area. It serves as a playroom, cafeteria, and auditorium.

Excavation and grading of the school site was subbed to Concho Construction Co., Oklahoma City. A Caterpillar D70 scraper hauled most of the grading along with two Caterpillar D7 bulldozers. Deep pipe tunnels which run under the wing corridors were also excavated with the scraper. A ½-yard Koehring backhoe opened up trenches for the wall foundations and a basement for the boilers. Total excavation ran about 22,000 cubic yards.

Columns for the structure are supported on bell-bottom footings. These are an average of 8 feet deep, and have a shaft diameter of 15 to 24 inches and a bell diameter of 27 to 72 inches. Holes for the footings were excavated by Powers Construction Co., Oklahoma City, with a Williams Post Hole Drill mounted on a Ford truck. The proper shaft diameter is obtained by changing augers. A Williams under-reaming tool cuts out the bell shape at the base of the shaft. Reinforcing steel is placed right in the hole and concrete chuted in place.

Next step in the job was forming the grade beams. These are 4 feet deep, 7½ to 13 inches wide, and run the full length of each wing—under the corridor walls and the outer walls. They were formed with ¾ and ⅝-inch plywood backed by 2 x 4 studs, 16 inches on centers, and double 2 x 4 walls 24 inches apart. A DeWalt 16-inch radial-arm saw and two 8-inch Skil portable saws handled all of the cutting. The forms were coated with a light paraffin oil and se-

Eaton 2-Speed Axle Trucks haul more, quicker, longer,



at lower cost

Eaton 2-Speeds give drivers the right gear ratio for road, load, and traffic conditions; permit quicker trips with full loads; reduce both operating and maintenance costs, make trucks last longer and worth more when traded in.

Ask your dealer for performance-record proof.

EATON AXLE DIVISION
MANUFACTURING COMPANY
CLEVELAND, OHIO

PRODUCTS: Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Rotor Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater-Defroster Units • Snap Rings Springtites • Spring Washers • Cold Drawn Steel • Stampings • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers

WON'T QUIT
or cause time out

A Hayward Bucket keeps the job going ahead on scheduled time. It won't quit or cause time out.

•

The Hayward Company
32-36 Dey Street
New York, N.Y.

Hayward Buckets

cured with Dayton and Richmond snap ties.

Lawton Transit-Mix Co. and Wilson Concrete Co., of Lawton, Okla., supplied the concrete for the job. The haul was about 5 miles. Mix design was a nominal 1:2½:3½, with 5½ sacks per yard and 6 gallons of water to the sack. A Master gasoline-powered vibrator insured complete consolidation around the reinforcing steel.

Thin slabs for the pipe tunnels and the boiler room were poured at the same time. The tunnel floor is just 1½ inches of concrete on 4½ inches of crushed stone. The boiler-room floor, 3½ inches thick, is reinforced with ⅜-inch rods 12 inches on centers in both directions. The slab lies on a minimum 6-inch sand fill.

Allied Steel Erection Service, Oklahoma City, subbed the steel work. All erection was handled by a light shop-made truck crane consisting of a 50-foot winch-powered boom mounted on an old Army half-track. Column steel was light—5-inch 18.9-pound H-beams, 3-inch-diameter pipes, and 2½-inch-square hollow steel for the classrooms, and 8 H 31's and 10 WF 49's for the all-purpose room. Bar joists were used over the classroom areas. Four trusses, 51 feet 4 inches long, peaked 6 feet 9½ inches at the center and spaced 20 feet apart, provided support for the roof over the all-purpose room. W & W Steel Co., Oklahoma City, supplied the steel.

This Clipper HD-49 masonry saw handled the cutting (dry) of all brick and tile on the job. Secor Building Co., Inc., Oklahoma City, Okla., was the contractor.

The trusses were delivered to the site in two sections with the members shop-riveted. Connections in the field were welded or butted.

With the steel in place, workmen laid the flooring—Flexicore prestressed slabs. They were shipped from Dayton, Ohio, by rail and then transferred to a flat-bed truck with a tail-mounted A-frame. The slabs were set in place by a unique rig provided by the manufacturer of the slabs, Price Bros. When all the slabs were in place, they were leveled and grouted together. A 3:1 sand-cement grout was matched in a 1-sack Muller mixer.

Benedict Bros., Britton, Okla.,

(*Concluded on next page, col. 4*)

DISTRIBUTORS

ALABAMA—Tractor & Equipment Co., Inc., 4402 First Ave. N., Birmingham 1.

ALASKA—Philpott Equipment Co., 573 Dexter Horton Bldg., Seattle 4, Washington.

ARIZONA—Lively Equipment Co., Albuquerque, N. M. State Tractor & Equipment Co., 407 S. 17th Ave., Phoenix.

ARKANSAS—Euclid-Memphis Sales, Inc., Memphis 2.

CALIFORNIA—The Euclid Road Machinery Co., Emeryville; 330 W. Maple St., Monrovia.

CANADA—Dietrich Collins Equipment Ltd., 890 S. W. Marine Dr., Vancouver 14, B. C.
Ferguson Supply Alberta Ltd., Calgary, Edmonton and Lethbridge, Alberta.
G. H. Gosdell Equipment Ltd., 425 Keating St., Toronto; P. O. Box 187, Port Arthur, Ontario; P. O. Box 66 NDB., Montreal, Que.
Maritime Newfoundland Agencies Ltd., P. O. Box 823, Halifax, N. S.

COLORADO—Constructors Equipment Co., 3707 Downing St., Denver 5.

CONNECTICUT—The W. I. Clark Co., 2195 Dixwell Ave., New Haven.

DELAWARE—L. B. Smith, Inc., Camp Hill, Penna.

FLORIDA—Florida-Georgia Tractor Co., 3808 W. Beaver St., Jacksonville; 2413 State Rd., Lot Iandi 3139 No. Miami Ave., Miami; 1400 S. Orange Blossom Trail, Orlando; New Quincy Highway, Tallahassee; 310 S. 12th St., Tampa.

GEORGIA—Tri-State, Inc., 890 Glenwood Ave. S.E., Atlanta 1; East Side Highway, Macon; Olive Rd., Augusta; 712-14 No. Washington St., Albany.

HAWAII—Grace Brothers, Ltd., 770 Ala Moana Road, Honolulu 10, Hawaii.

IDAHO—Intermountain Equipment Co., Broadway at Myrtle St., Boise; 310 No. 4th St., Pocatello.

ILLINOIS—Euclid-Chicago Co., 6527 Northwest Highway, Chicago 31.
Euclid Sales & Service, Inc., St. Louis 10, Mo.

INDIANA—Euclid-Chicago Co., Chicago 31, Illinois. Reid-Holcomb Co., 1515 Kentucky Ave., Indianapolis 21.

IOWA—The Euclid Road Machinery Co., Hibbing, Minnesota.
Fears Tractor & Equipment Co., Omaha 2, Neb.

KANSAS—The G. W. Van Keppel Co., Kansas City 8.

KENTUCKY—Euclid-Kentucky, Inc., 3900 Gritzmacher Drive, Louisville.

LOUISIANA—Euclid-Memphis Sales, Inc., Memphis 2.

MAINE—H. A. Burkitt, Inc., Route 1, R.F.D. 2, South Portland.

MARYLAND—Rish Equipment Co., Clarksburg, W. Va.
L. B. Smith, Inc., Camp Hill, Penna.

MASSACHUSETTS—Clark-Wilcox Co., 115 Western Ave., Boston 34.
The W. I. Clark Co., New Haven, Connecticut.

MICHIGAN—W. H. Anderson Co., Inc., 47 West Seven Mile Rd., Detroit 3.
The Euclid Road Machinery Co., Hibbing, Minn.

MINNESOTA—The Euclid Road Machinery Co., Highway 169 West, Hibbing.

MISSISSIPPI—Euclid-Memphis Sales, Inc., Memphis 2.

MISSOURI—Euclid Sales & Service, Inc., 2221 Manchester Ave., St. Louis 10.
The G. W. Van Keppel Co., 2441 Pennway, Kansas City 8.

MONTANA—Hall-Perry Machinery Co., P. O. Box 1707, Butte.

NEBRASKA—Constructors Equipment Co., Denver 5.
Fehrs Tractor & Equipment Co., 1809-11 Cuming St., Omaha 2.

NEVADA—The Euclid Road Machinery Co., Emeryville; Monrovia, California.
Poulter Equipment Co., Salt Lake City 8, Utah.

NEW HAMPSHIRE—Clark-Wilcox Co., Boston 34, Mass.

NEW JERSEY—L. B. Smith, Inc., Camp Hill, Penna.
Hubbard & Floyd, Inc., New York 51, N. Y.

NEW MEXICO—Lively Equipment Co., 5801 4th Fourth St., Albuquerque.

NEW YORK—Hubbard & Floyd, Inc., 151st St. & Gerard Ave., New York 51.
T. E. Potts Equipment Co., 3260 Sheridan Dr., Buffalo.
L. B. Smith, Inc., 327 W. Fayette St., Syracuse 2; 134 State St., Albany.

NORTH CAROLINA—Hampton Roads Tractor & Equipment Co., Norfolk, Virginia.
North Carolina Equipment Co., P. O. Box 880, Greenville; P. O. Box 1305, Charlotte; Swannanoa Creek Rd., Asheville; P. O. Box 159, Guilford; P. O. Box 695, Wilmington.

NORTH DAKOTA—The Euclid Road Machinery Co., Hibbing, Minnesota.

OHIO—The W. W. Williams Co., 835 Goodale Blvd., Columbus 2; 18301 Brookpark Rd., Cleveland 11; 914 Main St., Cincinnati 2; 1360 Conant St., Toledo (Maumee).

OKLAHOMA—Butler-Searby Equipment Company, Oklahoma City and Tulsa.

OREGON—Intermountain Equipment Co., Boise, Idaho.
P. L. Crosby & Co., 3146 N.W. Pettygrove St., Portland.

PENNSYLVANIA—Atlas Equipment Corp., 630 Ridge Ave., Pittsburgh 12.
Standard Equipment Co., 182 Norton St., Wilkes-Barre; Hepburn & Lycoming Sts., Williamsport.
L. B. Smith, Inc., Camp Hill (Harrisburg); 3000 Montgomery Avenue, Philadelphia.

RHODE ISLAND—Clark-Wilcox Co., Boston 34, Mass.

SOUTH CAROLINA—Carolina Equipment Sales Co., Sumter Highway, Columbia.

SOUTH DAKOTA—The Euclid Road Machinery Co., Hibbing, Minnesota.

TENNESSEE—Euclid-Memphis Sales, Inc., 180 S. Cutler Ave., Memphis 2.
Power Equipment Co., 1218 Island Home Ave., Knoxville; 600 W. Manning St., Chattanooga.

TEXAS—The Euclid Road Machinery Co., 1007 Lamar St., Dallas 2.
Lively Equipment Co., Albuquerque, New Mexico.

UTAH—Poulter Equipment Co., 1361 So. 2nd West, Salt Lake City 8.

VERMONT—Clark-Wilcox Co., Boston 34, Mass.

VIRGINIA—Hampton Roads Tractor & Equipment Co., W. 20th and Killam Ave., Norfolk.
Rish Equipment Co., 1001 Chamberlayne Ave., Richmond 10; 405 Center Ave. N.W., Roanoke 7.

WASHINGTON—Philpott Equipment Co., 573 Dexter Horton Building, Seattle 4, Washington.
P. L. Crosby & Co., Portland, Oregon.
Intermountain Equipment Co., E. 611 Sprague Ave., Spokane 9.

WEST VIRGINIA—Atlas Equipment Corp., Pittsburgh.
Rish Equipment Co., Kanawha Blvd., Charleston 22; East on U.S. 60, Clarksburg; P.O. Box 209, Bluefield.
L. B. Smith, Inc., Philadelphia, Penna.

WISCONSIN—Cunningham-Ortmayer Company, Milwaukee 46, Eau Claire and Green Bay.

WYOMING—Constructors Equipment Co., Denver 5.
Poulter Equipment Co., Salt Lake City 8, Utah.

You can tell by the **PERFORMANCE..**

sure they're

Wherever they're put to work, "Eucs" do the kind of a job that makes them the preferred equipment for moving earth, ore, rock and coal in off-the-highway service.

Big payloads, fast travel speeds and high job availability add up to more loads per hour and more profit per load. Whatever the job . . . building highways, dams, levees, airports . . . working in mines, quarries or on industrial projects, you can depend on "Eucs" for low cost hauling.

If you own "Eucs" you're already benefiting from their production and profit advantages. If you know them only by reputation, we suggest you get performance facts and figures from your Euclid distributor.

Euclid Scraper—15.5 cu. yds. struck, 21 cu. yds. heaped at 1:1 slope . . . 275 h.p. engine . . . top speed, loaded, 28.2 m.p.h.

Bottom-Dump Euclids—13 to 25 cu. yds. . . . 190 to 300 h.p. . . . top speeds loaded to 34.4 m.p.h.

Rear-Dump "Eucs"—10 to 34 tons . . . 125 to 400 h.p. . . . spring mounted or semi-rigid drive axles . . . top speeds loaded to 36.3 m.p.h.

The EUCLID ROAD MACHINERY Co., CLEVELAND 17, OHIO

EUCLIDS

A Heavy-Duty Hoist

A new heavy-duty model of the Roll-O-Hoist material elevator with a special "walk-through" feature for handling concrete buggies has been developed by Stampco Products, Minneapolis, Minn.

Rated at a capacity of 1,200 pounds the Stampco hoist can accommodate a standard 2-wheel concrete buggy, or can be furnished with a tip-over bucket for handling ¼ yard of concrete. Adjustable cross braces permit a 6-foot "walk-through" opening to be made at any loading or unloading level on the hoist, enabling workmen to roll buggies directly through the hoist frame.

The Roll-O-Hoist Model K consists of a vertical all-steel frame, mounted on two pneumatic tires. It has a 47-inch-wide x 57-inch-long platform and is powered by a 7½-hp gasoline winch or 3-hp electric motor. A remote-control mechanism enables a single operator to govern both the engine throttle and the brake from any position. Limit stops at top and bottom prevent the platform from over-traveling and a cam-operated safety device secures the elevator to the upright frame in the event of cable breakage. Optional with the power unit is a built-in centrifugal governing brake which controls the speed of a free-falling load.

The Model K may be used for handling building and roofing materials of all kinds. Basic height is 32 feet; additional height is secured with 10-foot extensions.

Further information may be secured from Construction Machinery Sales Co., 447 Vinton St., Waterloo, Iowa, national distributor. Or use the Request Card at page 18. Circle No. 350.

Pipe and Cable Locators

Literature on its line of M-Scope instruments for locating pipe and cables is announced by Fisher Research Laboratory, Inc., 1961 University Ave., Palo Alto, Calif. Illustrations show the instruments measuring depth of pipe, and locating survey stakes, conduit boxes, valves, and service lines.

The M-Scope consists of a transmitter and receiver. In operation, the transmitter sends out a continuous signal. When there is no metal interposed between the two units, a certain volume of sound is heard in the earphones of the receiver, and a meter mounted on the receiver gives a definite reading. But if a metal object lies between the two units, the sound heard in the earphones will be louder and meter reading higher.

Complete M-Scope equipment includes one transmitter, one receiver, earphones, spirit level, and conductive wire with clips. These are fitted into a carrying case.

This literature may be obtained from Fisher. Or use the Request Card at page 18. Circle No. 303.

Hydraulic Research Text

"Hydraulic Research in the United States", National Bureau of Standards Miscellaneous Publication 205, edited by Helen K. Middleton and Sonia W. Matchett, contains information compiled from reports on current projects by 100 hydraulic and hydrologic laboratories in the United States and Canada. These projects are listed chronologically and can be readily referred to by means of a list of the laboratories or sponsoring institutions and a comprehensive subject index. The volume also includes: lists of foreign publications and translations which are available on loan from various laboratories; a list of the many national hydraulic and hydrologic committees; and a section containing notes from a number of laboratories.

The book may be obtained from the U. S. Government Printing Office, Washington 25, D. C., for $1. (Foreign remittances must be in U. S. exchange and should include an additional one-third of the publication price to cover mailing costs.) Detailed information regarding the research projects reported may be acquired directly from the laboratories as listed in the volume.

New Modern School For U. S. Army Base

(Continued from preceding page)

subcontracted the brickwork. A common red brick was backed with hollow-core red-clay tile. A Clipper HD-49 masonry saw handled the large amount of cutting that was necessary. The contractor used a 14-inch Clipper Diamond Blade for the brick.

All classroom and office areas were roofed over with tongue-and-groove roof panels covered with a built-up decking. Corridor roofing and skylight for the all-purpose room is a corrugated-plastic paneling.

Construction of the new school was directed by R. T. Quillin, Superintendent for Secor Building Co.

Give to the Blood Bank!

How Allis-Chalmers MOTOR SCRAPERS Help Cut Cost per Yard

Positive, forced ejection . . . eliminates wasteful circling or other time-consuming methods of removing the load. Allis-Chalmers' patented forced-ejection system plus high apron lift *bulldozes* dirt out of the bowl fast every trip . . . without extra wear and tear on power control unit cables and clutches.

Easy operation. From foam rubber seat to finger-tip control, shock-free hydraulic steering and full visibility, a TS-300 operator has every available help for safe, sure, speedy work. Balanced weight distribution and low center of gravity make A-C MOTOR SCRAPERS easy to maneuver even at top speed.

New Cinder Spreader

A new truck-mounted cinder spreader is the latest addition to the line manufactured by Hercules Steel Products Corp., Galion, Ohio. The unit spreads full-road or half-road width at one pass and is controlled from the cab by a single driver-operator, or manually. New baffles adjust to any spread pattern to keep cinders from scattering and hitting parked cars or other vehicles. Bolt-on deflector plates permit replacement of worn and abrasive-cut baffles.

The conveyor and spinner mechanisms are powered by a truck-transmission power takeoff and an auxiliary transmission for greater spinner-speed variance. A wet or dry clutch for spot-concentration spreading is also available. A new preheater which uses the truck engine's exhaust heat to prevent chunks of frozen cinders from forming next to the body conveyor chain eliminates load hangup due to freezing conditions and is said to assure a uniform spread of small even-sized cinders.

The new Hercules cinder spreader comes in 5 and 9-cubic-yard sizes with 11-foot length.

The hopper body comes in standard sizes of 5 and 9 cubic yards, with 11-foot length. Other capacities and lengths are also available on special order.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 319.

Slag Association Officers

At the 35th Annual Meeting of the National Slag Association, held in Washington, D. C., on November 12 and 13, C. A. Barinowski and R. O. Dierker were re-elected President and Vice President respectively. Mr. Barinowski is with the Birmingham Slag Co., Birmingham, Ala., while Mr. Dierker is President of the Duquesne Slag Products Co., Pittsburgh, Pa.

In his annual report, E. W. Bauman, Managing Director and Secretary, summarized the activities of the Association, and the progress of various projects that were undertaken in the preceding year.

Director of Research Fred Hubbard, Consulting Engineer with Cambria Slag Co., Sharon, Pa., told of a comprehensive investigation that was made to determine the physical and chemical characteristics of expanded slag. The outstanding feature of the investigation was the effect of filling the cores of standard hollow masonry units with expanded slag prior to subjecting the walls to a fire test. Blocks of 8 x 8 x 16-inch size, with 1¼-inch face shell thickness and a core volume of approximately 43 per cent, were given a 2-hour rating when used with the cores unfilled. According to the Fire Underwriter's report, the blocks developed a 4-hour rating when the cores were filled with expanded slag.

The latest recommendations were outlined for the use of slag in both portland-cement-concrete and bituminous-concrete mixes. Specifications for lightweight aggregate with reference to slag were also a subject of the research report.

A Plumbing-Data Booklet

A useful data booklet for simplifying layout and installation of cast-iron drainage plumbing has been issued by the Cast Iron Soil Pipe Institute, 1627 K St., N. W., Washington 6, D. C. "Guide for Federal Specifications WWP-401" combines in a single publication Federal specifications for service-weight and extra-heavy cast-iron soil pipe and fittings. It covers information necessary in laying out soil, waste, and vent systems in accordance with Government standards.

This literature may be obtained from the Institute, or by using the Request Card at page 18. Circle No. 351.

Faster, easier loading . . . because A-C MOTOR SCRAPERS have up to 20 hp. to handle every struck yard . . . plus offset cutting edges and "center-boiling" loading action that spills the dirt evenly, filling corner voids for full capacity loads.

High-speed hauling. The power behind the TS-300 teams up with big, traction-type tires that gear it to the road . . . move capacity loads at 22.5 mph. And operating clearance of 20 in. helps keep it from hanging up on rutted haul roads.

rd by Cutting Time per Yard

A dirt-moving "package" that makes every second count. The powerful HD-20 torque converter tractor is an ideal teammate for the TS-300. It synchronizes to scraper speed at contact . . . automatically loads at fastest speed conditions permit with less strain on operator and equipment . . . gives scraper an extra fast start to the fill.

Your nearby A-C dealer will be glad to give you more yardage-boosting facts about job-tested, *job-proved* MOTOR SCRAPERS. He can also tell you where you can see them at work and talk to the men who own and operate them. You owe it to yourself to call or stop in soon.

TS-300 MOTOR SCRAPER
14 cu. yd. struck capacity
18 cu. yd. heaped capacity
280 hp. Buda diesel or
275 hp. Cummins diesel

TS-200 MOTOR SCRAPER
10 cu. yd. struck capacity
13 cu. yd. heaped capacity
176 hp. Buda diesel or
165 hp. Cummins diesel

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

A-C THE FINEST LINE ON EARTH

"Okay Mac, let 'er go!"

1. A snow cornice rises dangerously over U. S. 6 in Colorado's Loveland Pass area. If it turns loose with an automobile underneath, it might mean certain death.

2. The vibrations set up by heavy trucks may be enough to send the cornice crashing down. A penetrometer determines snow densities, one of the factors involved in slides.

3. The DuPont special gelatin dynamite charges are prepared with caps and fuse for planting.

Colorado Experiments With

Man-Made Snowslides

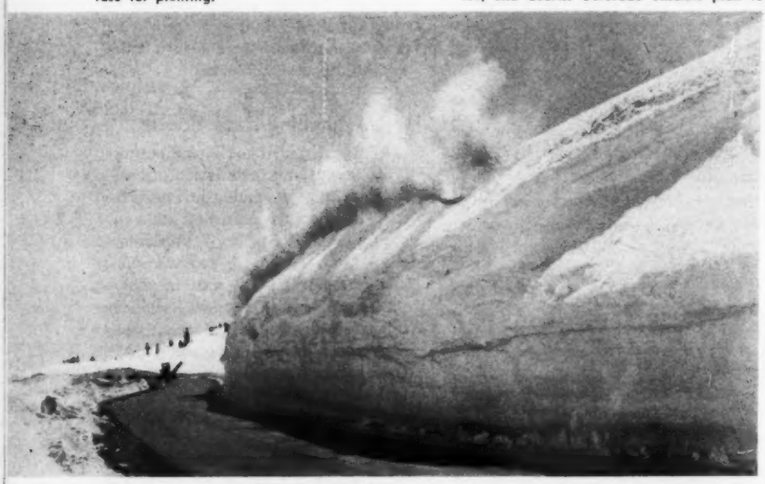
• WHAT can a state highway department do about snowslides? It can intercept them, and bring them down before they hurt anyone. On the basis of tests conducted both in Switzerland and in this country, Colorado plans this year to step up pilot experiments conducted in 1951.

Whether a snowbank is solid, contains ice, or has a center of loose snow; the shape of the snow crystals; moisture content and weight of the snow; wind velocity and direction; humidity; and even the history of the mountain pass—all these have a bearing on when a slide will let go.

According to Ed Taylor, Director of the National Ski Patrol and a partner in the Denver firm of Gunderson-Taylor Equipment Company, dangerous snowbanks are usually formed by wind-driven snow carried over a hill. Taylor's firm developed a penetrometer for measuring snow densities. From background data on snow banks, highway officials may be able to predict a slide within 8 hours.

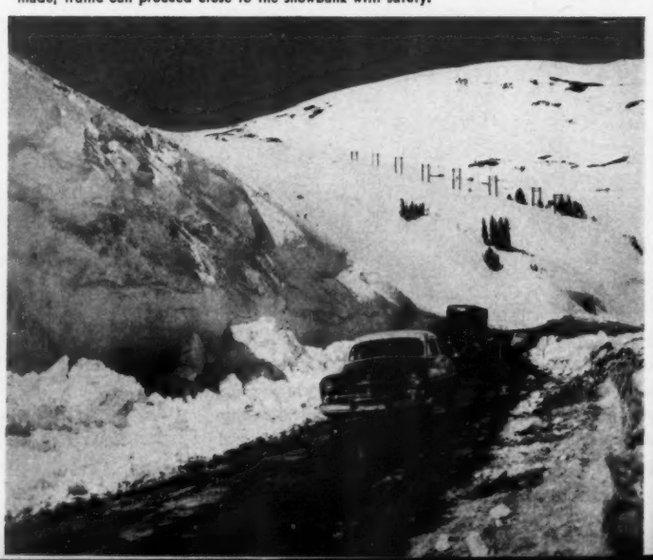
Details of this year's tests will be carried in a future article.

4 and 5. After the charges are planted along the cornice, they are wired to the firing mechanism. A flip of the switch, and the powder explodes with a roar, setting off the slide. A real danger-area shot like this, properly placed, may bring down thousands of tons of snow, ice, and debris. Colorado officials plan to do snowslide experiments with cannon this year.



6. Now come the big Bros rotaries to clean away the huge pile. Nice thing about artificial slides is the fact that plenty of equipment can be brought up to handle the material.

7. One pass of the rotary clears the snow for one-way traffic. When the final cleanup is made, traffic can proceed close to the snowbank with safety.



Supervise For Safety

Many hidden factors will affect job profit and often these factors are manifested by the occurrence of accidents, according to Philip A. Havey of the Hartford Accident & Indemnity Co., Hartford, Conn. These remarks were included in an address Mr. Havey made last September to the Construction Section of the Maine Safety Conference. Every means should be used, he said, to eliminate unnecessary expenses during these days of awarding contracts by the bid system, and accidents, besides being costly and frequent, are all too often avoidable. In a year approximately 300,000 lost-time injuries occur in the construction field, and these, figured on a nation-wide scale, have a direct cost of about $750 each. Much of this direct expense is borne by insurance companies, but the higher the injury rate, the higher the outlay for insurance protection.

Aside from the direct cost, there is the heavier hidden expense assumed by management, in the form of delays, damaged equipment, and material. These are costs that impede the successful completion of a contract at a profit. What is the relation of an employee injury to these costs? An injury indicates that something, somewhere, is wrong; that there are one or more "sore" spots in the organization machinery. What are these conditions? How does one locate or ferret them out?

It is agreed that personal injuries are caused by an unsafe act, an unsafe condition, or a combination of both. Let us look first to the act, said Mr. Havey. Here the importance of supervision cannot be stressed enough. Top management, right down through the entire supervisory force, must recognize the importance of carefully selecting, placing, training, and leading employees. A man should be placed on the job best fitted to his qualifications and given the necessary training. Then his subsequent activities should be followed in the best interests of the man and the company. The individual must be led well, with the result that he will do his job correctly and safely.

Unsafe conditions or environment are also the supervisor's responsibility. All equipment should be properly selected, used, and maintained; all material should be properly selected, placed, handled, and processed.

A few examples of ineffective supervision come to light in the following cases: A man was crushed by the bottom of a steel shovel cab as it swung on its base. The man had been making a minor repair. Cause? Improper training and leading of the individual. In another instance, a boom-hoist cable broke, and the boom and bucket fell into the excavation, killing a man and causing costly damage to the boom along with an extensive delay in operations. Cause? Improper cable socketing—a case of equipment not being properly maintained.

Many people say that carelessness on the part of the individual involved is the sole cause of accidents. But the word "carelessness" does not exist in the safety man's dictionary. There is an underlying cause for every case.

Mr. Havey is firmly convinced that if proper consideration is given to equipment, material, and people through good supervision, safety will take care of itself. An orderly job will result, and an orderly job means a safe one.

Good lubricants at regular intervals are good for your equipment.

Mechanical Method Computes Coordinates

An instrument said to obtain rectangular coordinates of points without the use of computing machines and tables of trigonometric functions has been announced by Geo-Optic Co., Inc., 170 Broadway, New York 38, N. Y. The Coorapid shortens and simplifies the usual procedure of computation of rectangular coordinates in such a way that it reproduces the geometrical figures mechanically, using only data obtained in the field. From this follows the immediate reading of results (differences of the rectangular coordinates of the points). Distance and angle values only are set in the machine. The manufacturer points out that an unskilled person can be trained to use the machine in a few hours.

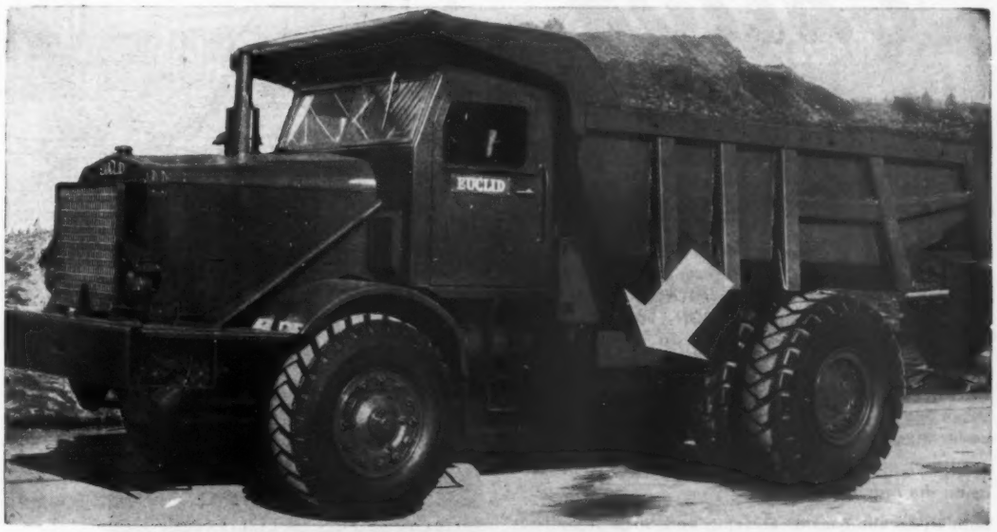
Spare parts and adjustment service for the Coorapid are available in the company's New York factory.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 323.

Rust-Inhibitor Data

Use of the rust inhibitor Banox with salt for clearing streets and roads of snow or ice is described in a new folder issued by Calgon, Inc., P. O. Box 1346, Pittsburgh 30, Pa. It describes how one part of Banox to 100 parts of salt protects metal surfaces of vehicles against corrosion. It also points out that Banox is a nontoxic odorless polyphosphate compound which is harmless to the skin, eyes, clothing, shoes, paint, auto finishes, tires, and animals.

This literature may be obtained from the company, or by using the Request Card at page 18. Circle No. 282.



EUCLID 22 TON MODEL TD FEATURING HYDRAULIC BOOSTER STEERING. Marvel Synclinal Filters are installed in sump (indicated by arrow) as standard equipment to protect the entire hydraulic system against damage from the highly abrasive particles prevalent under the severe conditions to which "EUCS" are subjected.
(Photo Courtesy Euclid Road Machinery Co., Cleveland, Ohio)

MARVEL SYNCLINAL FILTERS

Insure Dependable
PROTECTION and SERVICE
in Hydraulic and Low Pressure Systems

SUMP TYPE (Cutaway) LINE TYPE (Cutaway)

More and more manufacturers and users of hydraulic machines and other equipment with low pressure, non-corrosive liquid systems are depending on Marvel Synclinal Filters to protect their machines' efficiency. Marvel Synclinal Filters are speeding production in a wide range of industries. They offer longer periods of operation between cleanings plus simplicity of design which enables ordinary workmen to quickly disassemble, clean and reassemble the filter on the spot. Turning a single handnut releases line type for cleaning without disturbing pipe connections.

★ WATER FILTERS — In response to the great demand, we have adopted both our sump and line types for use in all water filtering applications. No changes have been made in the basic synclinal design.

A SIZE FOR EVERY NEED

Sump and line type models available in capacities from 5 to 100 g.p.m. and in mesh sizes from 30 to 200.

Write for Complete Engineering Data
Specify Oil or Water

Meets J.I.C. Standards

MARVEL ENGINEERING COMPANY
625 W. Jackson Blvd. Chicago 6, Ill.

Vulcan Tools
Rock Drills, Pavement Breakers and Clay Diggers

Vulcan Tool Manufacturing Co.
35-42 Liberty Street, Quincy 69, Mass.

Branch Offices and Warehouse Stock.
74 Murray St. New York 7, N. Y. 34 No. Clinton St. Chicago 6, Ill.

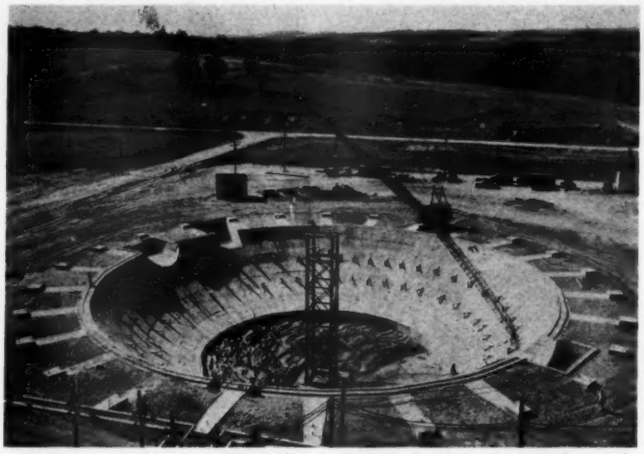
Send for catalog or see your local distributor.

Sphere to House Submarine Reactor

AEC Complete Saucer Foundation For Navy's Nuclear-Power Plant

• STEEL spheres are not new. They have been widely used in both the chemical and petroleum industries. But in West Milton, N. Y., just north of Schenectady, a circular structure unlike any other in the United States was recently constructed by the Atomic Energy Commission. Built for the U. S. Navy, the sphere is to house a nuclear submarine power plant, known as SIR, or Submarine Intermediate Reactor.

The spherical design was adopted to give additional protection to operating personnel and to off-site areas during test operations beyond the many safety controls of the reactor itself. Aside from being the largest of its type in America—225 feet in diameter—the structure is designed in such a way that, even if all other controls fail, the resulting release of radioactive material can be contained in the sphere, which has a net "free" space of more than 5,400,000 cubic feet.



This huge concrete saucer at West Milton, N. Y., is the foundation for a 225-foot steel sphere that will house an atomic power plant. Built by the AEC for the U. S. Navy, the project is under the direction of the Knolls Atomic Power Laboratory which is operated by the General Electric Co., Schenectady, N. Y.

Excavation and Foundation

Elmhurst Contracting Co., Inc., Corona, Long Island, N. Y., was contractor for the excavation work. A total of 71,331 cubic yards—consisting of 30,600 cubic yards of excavation and an additional 40,731 cubic yards of embankment—was necessary. Special consideration had to be given to the high ground-water level, which was overcome by using two lifts of Griffin wellpoints.

The saucer-shaped foundation on which the sphere rests is 179 feet in diameter and 42 feet deep. Ardini & Pfau, Inc., Syracuse, N. Y., was the contractor. Made of reinforced-concrete, the foundation was completed in 59 days. Blaw-Knox Construction Co., Pittsburgh, Pa., designed it.

Superstructure

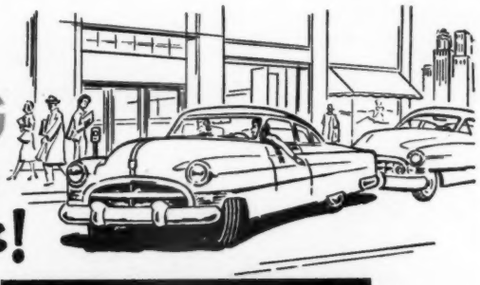
The reactor and the sphere enclosing it are to be located on a 4,000-acre site, 706 feet of which will be taken up by the outer periphery of the sphere. Chicago Bridge & Iron Co., Chicago, Ill., is designer and builder of the sphere. The shape was chosen as containing the required volume at the least cost. The skin of the sphere will be made up of welded-steel plates, hoisted into position by a derrick, mounted on top of a temporary central steel tower, 424 feet above ground level. A ring of 26 steel columns set on concrete outside the structure and reaching to the middle of the sphere will give further support to the building. As soon as the columns are in place, the first ring of welded-steel plates will gird the sphere at its center and assembly will proceed both upwards and downwards.

Material used for the sphere includes A201 Grade B firebox steel and A7 structural steel for the supporting members. The shell needs 682 plates approximately 9 x 32 feet; thickness, 0.94-1.06 inches. The cylindrical steel columns are 74 feet long, 24 inches in diameter, and ¼ inch thick. Total weight of the superstructure is 3,850 tons.

Welding

Welding methods used are half automatic machine weld and half mul-

GALION
BOOSTER STEERING
Smooth, Effortless, Precise
-just like on fine motor cars!



Hydraulic Booster Steering was recently adapted to fine automobiles — to eliminate hard work. Over seven years ago it was applied to GALION 118, 104 and 203 Motor Graders — for the same reason.

Experienced grader operators are enthusiastic about GALION booster steering because it eliminates tiring strain and gives them complete command of the grader under all service conditions.

Another GALION feature is large front tires (same size as on the rear wheels).

Both Hydraulic Booster Steering and large front tires are included as *standard* equipment.

OTHER HIGH-QUALITY GALION FEATURES

- Positive, four-wheel, all-gear tandem drive.
- Constant-mesh transmission.
- Time-tested, fool-proof hydraulic system — designed and built by Galion.
- Extra-rugged, box-type single member frame; high-arched for maximum blade adjustment.
- Correct weight distribution.
- Powerful, quick-starting diesel engines.

Write for literature.

Why pay extra?
Why take less?
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MOTOR GRADERS · ROLLERS

THE GALION IRON WORKS & MFG. CO., General and Export Offices, Galion, Ohio, U.S.A.
Cable address: GALIONIRON, Galion, Ohio

SASGEN
New Electric-Powered CHAMPION DERRICK

Boom only can be supplied for use with old-style Mast and bottom

Single line cap. 300# @ 100 feet per minute

Double line cap. 600# @ 50 feet per minute

The most complete line of contractors' derricks, hoists, and winches. Write for catalog.

The Sasgen line is handled by leading equipment distributors everywhere.

SASGEN DERRICK COMPANY
3131 W. Grand Avenue, Chicago 22, Illinois

tipass hand weld. A unique feature of the project is that every weld in the structure has to be X-rayed to assure that there are no leaks. To do this on the bottom, a 4-foot space is provided temporarily between the base of the sphere and the concrete saucer. After testing is completed, this space will be filled with lean concrete and aggregate. Inside, the 3-foot-thick concrete floor on which the reactor is to rest will be slightly above ground level and the well of the saucer beneath the floor will be filled with a compacted mixture of aggregate and earth.

Two entrance locks, each consisting of a 16½-foot sphere, are being constructed to attain circular intersections with the large sphere in order to avoid points of stress concentration, and the welds around the entrances will be stress-relieved prior to assembly. Doors will be double, watertight, ship-bulkhead type.

Hull Assembly

The hull and power plant is to be erected by the Electric Boat Division of the General Dynamics Corp., Groton, Conn. The hull will be assembled outside the building and when the latter has been completed and tested, the hull will be skidded into the huge ball through a special wall section and the sphere sealed again.

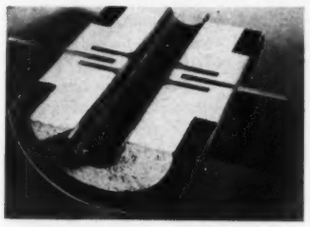
SIR is one of two nuclear-science approaches being made to the problem of utilizing atomic fuel for underwater ship propulsion. (The other type is incorporated in a project at the National Reactor Testing Station in Idaho.) The reactor uses liquid sodium metal to take the heat out of the reactor core and into an exchanger or "boiler" where water is converted to steam. The steam then drives the turbines that propel the submarine.

The entire project is under the direction of the Knolls Atomic Power laboratory operated at Schenectady for the AEC by the General Electric Co.

Buy a U. S. Defense Bond today.

Reduces Heat Loss

A new type of insulated anchor for use in underground insulated pipe systems conveying hot or cold liquids or gases is approved by the Durant Insulated Pipe Co., Warren Way & Bay Road, Palo Alto, Calif.



The anchor is so constructed that contact is eliminated between anchor plate and pipe. The plate is insulated from the pipeline both thermally and electrically by a noncompressible block of Transite sheet material. The design and material are said to minimize heat loss at anchorage points and prevent pipeline corrosion due to electrolytic action. The entire line can be insulated from the ground by taking supplementary precautions to insulate the line at the terminals.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 264.

Tough Conveyor Belt

A new conveyor belt has been placed on the market by New York Belting & Packing Co., 1 Market St., Passaic, N. J. Designed for use where conveyor belts may be subject to severe ripping or tearing action by foreign objects, its carcass has multiple strands of high-tensile steel wires embedded at 3-foot intervals. If a foreign object punctures the belt, the tearing is limited to a maximum of about 3 feet lengthwise, the company claims.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 352.

Universal-Joint Catalog

A line of power takeoff universal joints is described in a booklet by Neapco Products Inc., Pottstown, Pa. Detailed drawings, photographs, specification tables, and performance charts give information on the 1500-1600 series. Single joints of three standard lengths, unwelded center assemblies, and rectangular telescoping center assemblies are covered.

This literature may be obtained from the company, or by using the Request Card at page 18. Circle No. 304.

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CONSTRUCTION MACHINERY DIVISION
BARNARD & LEAS MFG. CO., INC. • CEDAR RAPIDS, IOWA

Raymond Concrete Pile News

Myron W. Krueger has been elected Vice President of Raymond Concrete Pile Co., New York, N. Y., foundation and heavy-construction contractor. At the same time Henry A. Federa was elected Secretary. Mr. Krueger, who has been with the company since 1948, will continue as Treasurer and a director. Mr. Federa was formerly Secretary, General Attorney, and a director of Orinoco Mining Co., New York, N. Y., a subsidiary of the United States Steel Corp.

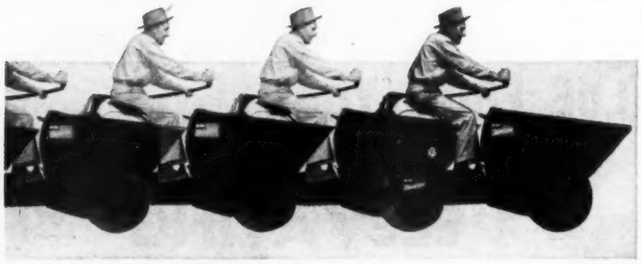
A Good-Roads Movie

"Better and Safer Highways" is a new motion picture describing a long-range program for modernizing the nation's obsolete highways and streets. The program is a "dynamic approach" embodying street and highway widening, erection of off-street parking facilities, construction of express freeways, standardization of road signs and hand signals, and the setting up of driver-training courses for young people and beginning drivers. The nation's leaders in business, industry, agriculture, labor, and the Government are urged to get behind "Project: Adequate Roads", a good-roads movement supported by more than 40 national organizations.

Harvey Firestone, Jr., Chairman of The Firestone Tire & Rubber Co., who is featured in the film, points out that the price the nation pays for its antiquated street and highway systems includes a tragically high auto-death rate, economic losses amounting to several billions a year, a crippled flow of commerce, the nerve-racking strain drivers face when subject to stop-and-go traffic conditions, and the business losses incurred by merchants when people take their trade to other less congested areas. "Our horse-and-buggy streets are no longer adequate to meet our 100-hp needs . . . our future progress depends upon better and safer highways."

The 7-minute film is available for free loan to service clubs, safety councils, high schools, television stations, and similar organizations, by writing to Association Films, 347 Madison Ave., New York 17, N. Y.

"FASTEST STOP AND GO CONCRETE HANDLING"



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Sterling trash handling impeller is automatically self cleaning...recirculating priming action is automatic, never fails...suction check valve positively seals repriming water in pump body...plus many more advantages that make these the MOST DEPENDABLE PUMPS MONEY CAN BUY!

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ABOVE—A 24" SONOTUBE being poured at Pierce & Phelps Company Building, Philadelphia. Hunt and Gregory, Architects. Robert E. Lamb, Contractor. Photo by E. Troiani.

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CBS Television Center, Los Angeles. Pereira and Luckman, Architects. Photo by Ezra Stoller, for CBS.

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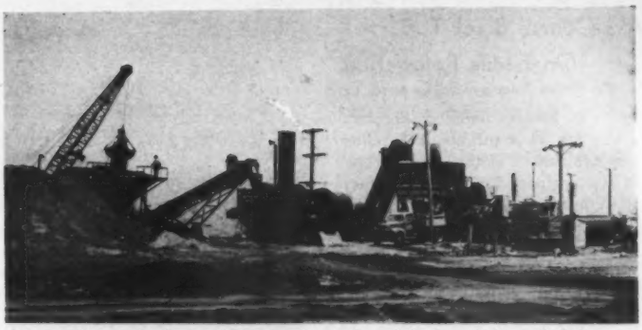
Completely Portable Plant Supplies Hot-Mixed Hot-Laid Asphaltic Concrete For Relocation Work



Here is the completely portable Pioneer Continuflo asphalt plant which supplied the paving mix on the U. S. 77 relocation project near Oklahoma City, Okla. *C. & E. Photo*

• AS the southwest continues to increase its contribution to the industrial might of the nation, the highways in that region are being subjected to ever-increasing traffic loads. Oklahoma, for example, is waging an incessant battle to replace functionally obsolete roads with modern highways to carry increasing volumes of high-speed heavy-duty truck traffic. Though the construction of the Turner Turnpike is one of the more spectacular projects of this type in the state, hundreds of smaller jobs combine to form a network of roads of even greater importance. These roads feed to and from the major cities of the southwest and provide in effect the arteries of industrial life.

One such project, a typical one, was the relocation of U. S. 77 south of Oklahoma City. The road carries a major portion of the north-south traffic across Texas, Oklahoma, and Kansas. The 7 miles of new construction near Moore, Okla., replaces a section particularly inadequate by modern standards. Grading contracts, completed last year, eliminated the sharp turns and steep grades of the old section. Amis Construction Co., Oklahoma City, held the $946,000 low-bid contract for the paving and placement of a selected subgrade. The paving, completed this year, was begun in September, 1951. It provides a triple-course asphaltic-concrete pavement for heavy truck-loads.

The new roadway has two 24-foot pavements divided by a 30-foot median. The pavement was laid in three courses. The two lower layers of base material are 3 inches thick; the surface layer is 2 inches thick. The layers are 25, 24½, and 24 feet wide, respectively. The median is completely covered by 6 inches of top-soil and Bermuda-grass sod, and is separated from the pavements by a 6-inch-high curb on each side. The pavement slopes away from the median ⅛ inch to the foot.

Shoulders in the new road are 10 feet wide. They are stabilized with asphalt and slope ½ inch per foot. Ditches, 4 feet wide, parallel the road on each side. Fill slopes up to 10 feet in height are 4 to 1. Above this they are 2 to 1. Backslopes less than 6 feet are 4 to 1 and over 6 feet are 2 to 1.

Pit Yields Four Materials

Placing 200,000 cubic yards of a suitable soil subgrade to a depth of 12 inches was included in the paving contract. Webb Construction Co. of Sulphur, Okla., supplied the soil under a subcontract with Amis. Four Allis-Chalmers HD-5's with 1-yard

(Continued on next page)

SELF-PRIMING CENTRIFUGAL PUMPS

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Engine belt and electric driven pumps with many new features to give you outstanding performance at low cost. A.G.C. rated. Write for special bulletins.

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A new booklet . . . just out . . . entitled "Challenge Sizes" shows you the size truck best suited for your Challenge Mixer . . . how Challenge helps you receive a bigger return on your investment. Send for it today. It's free! Remember, only Challenge has 3, 3½, 4, 5, 6, & 6½ cubic yard size truck mixers, the nation's widest selection . . .

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A 3-Course Black Top On 7-Mile Relocation

(Continued from preceding page)

front-end loaders handled this part of the job at a pit about 5 miles from the center of the project. The pit also yielded the Bermuda-grass sod, topsoil, and sand for the asphaltic concrete.

A homemade cutter pulled by a Ferguson farm-type tractor took off the sodding in slabs 10 inches wide and 3 inches thick. Then the HD-5's removed 1 foot of topsoil. Beneath this was a 4-foot layer of sand suitable for use in the AC paving mix, and below this, a material suitable for the subgrade. The specifications called for a soil with a liquid limit of 35 or less, a plasticity index of 15 or less, and between 20 and 80 per cent passing a No. 200 screen.

The subgrade material was unloaded in the roadway by the dump trucks shuttling back and forth from the pit. Three Caterpillar No. 12 motor graders spread the material in 6-inch lifts for compaction by a 6-section Bros sheepsfoot roller pulled by an International TD-14 tractor. Water, necessary to bring the soil to a 12 per cent optimum moisture, was sprayed in through a 10-foot bar mounted on a 4,000-gallon water truck.

A Barber-Greene Finisher made the laydown. Amis Construction Co., Oklahoma City, Okla., was the contractor on the job. *C. & E. Photo*

Prior to paving, Amis primed the subgrade with an MC-1 cutback asphalt. An Etnyre Black-Topper applied the asphalt in two 14-foot-wide sprays at a rate of 0.35 gallons per square yard and a temperature of 135 to 150 degrees F.

Gas Heat Cheaper

A completely portable Pioneer Continuflo asphalt plant set up at the southern end of the job supplied all of the mix for this contract and two adjacent ones held by Amis. Average production of the plant wa 165 tons per hour—though often it was stepped up to 180 tons per hour. Amis had an International TD-14 dozing the stockpiles with a Marion crane carrying a 1-yard Blaw-Knox bucket charging the feed bunker. A 30-inch-wide 50-foot-long cold conveyor carried the aggregates up to the drier. The drier was 90 inches in diameter, 24 feet long, and operated at a speed of 9.6 rpm. Four Webster natural-gas burners supplied the heat. Amis saved about $25,000 on the production of 100,000 tons of AC mix by using natural-gas fuel. The contractor laid 1.3 miles of 6-inch quick-coupling "invasion-type" pipe to bring the gas to the plant.

The hot elevator carried the aggregates up to 4 x 10 Pioneer vibrating screens. For the base mix, Amis used a 1½-inch, a ½-inch, and a No. 6. For the surface mix, he used a ⅞-inch, a ¼-inch, and a No. 6. A second hot elevator carried the aggregates from the three hot bins to the pugmill. The pugmill in the Pioneer plant first blended the aggregates in a dry-mix chamber and then passed them to the spray chamber. Here the bitumen was delivered by two spray nozzles which gradually brought the mix up to the proper bitumen content. The plant thus provided a uniform and continuous flow of aggregate and bitumen to the discharge hopper.

Asphalt for the job was supplied by Kerr-McGee Oil Industries, Inc., Oklahoma City. It was delivered at 300 degrees F in 4,200-gallon Fruehauf insulated trailers from the company's plant at Wynnewood, Okla., 53 miles from the project. A Cleaver-Brooks booster fed the asphalt into two 10,000-gallon storage tanks at the plant. These were hauled by a Cleaver-Brooks 15-hp boiler. The booster recirculated the bitumen when it wasn't being used for pumping in a new supply.

Dolese Bros., Inc., Oklahoma City, supplied the stone from its quarry at Big Canyon, Okla. A single-track spur of the Sante Fe was located alongside the Amis plant. Webb Construction Co. brought the sand in by trucks. Water for the plant was piped over from a nearby well, and electric power was supplied from the lines of the Oklahoma Gas & Electric Co.

New 200-ton rubber-tired roller rolls on TIMKEN® bearings

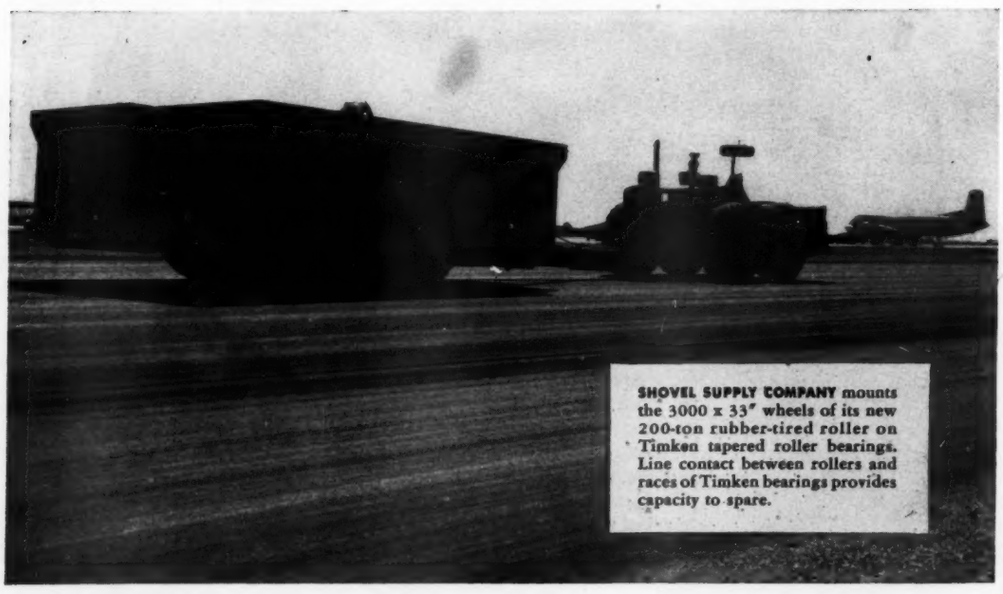
THIS new 200-ton rubber-tired roller was designed and built by the Shovel Supply Company to test fills on runways for heavy jet bombers and transport planes. Designed in two halves, so that each half will oscillate independently, the giant roller is equipped with four, 3000 x 33″ tires on specially built wheels.

To carry the 200-ton load safely with smooth, free-rolling action, Shovel Supply engineers specified Timken® tapered roller bearings for the wheels. They easily carry the tremendous radial and thrust loads set up by the oscillating halves of the roller. Their tapered construction takes loads from any direction and line contact between rollers and races provides extra load-carrying capacity.

Timken bearings also prevent breakdowns or excessive wear due to the continuous shock loads that occur in an earth rolling operation. They are case hardened to have tough, shock-resisting cores and hard, wear-resistant surfaces. Their true rolling motion and smooth surface finish minimize friction and wear.

For giant machines like this, or wherever your wheels and shafts turn, be sure to specify Timken bearings. And always look for the trademark "Timken" stamped on the bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ont. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



SHOVEL SUPPLY COMPANY mounts the 3000 x 33″ wheels of its new 200-ton rubber-tired roller on Timken tapered roller bearings. Line contact between rollers and races of Timken bearings provides capacity to spare.

GREATER LOAD AREA

Because the load is carried on the *line* of contact between rollers and races, Timken bearings carry greater loads, hold shafts in line, wear longer. The Timken Roller Bearing Company is the acknowledged leader in: 1. advanced design; 2. precision manufacturing; 3. rigid quality control; 4. special analysis steels.

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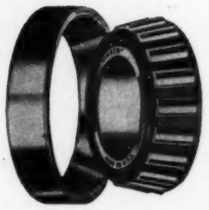
TAPERED ROLLER BEARINGS



NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ◫ AND THRUST ↔ LOADS OR ANY COMBINATION

DRILLING CONTRACTORS

Diamond and Shot Core Borings, Dry Sample Borings, Grout Holes and Pressure Grouting, Foundation Testing for Bridges, Dams and all Heavy Structures

Manufacturers, also, of Diamond Core Drilling Machines and complete accessory equipment, including all types of Diamond Drilling Bits.

SPRAGUE & HENWOOD, INC.

Dept. C, Scranton 2, Pa.

Specifications called for an asphalt with an 85-100 penetration for both the base and surface mix. The design limits for the two mixes were:

Material	Per Cent Passing Base Mix	Surface Mix
1½ inch	100	.....
1 inch	90-100	.....
¾ inch	.....	100
½ inch	65-80	90-100
No. 4 screen	40-55	55-80
No. 10 screen	30-45	40-55
No. 40 screen	20-30	20-37
No. 80 screen	10-20	10-25
No. 100 screen	3-5	4-8
Asphalt content	4.5-6.5	5-7

Ford F-7 trucks mounting 6-yard Heil dump bodies carried the hot-mix from the plant to the road. A Barber-Greene Finisher made the laydown in varying lane widths. The specifications required that the center joints of the three courses be separated by at least 6 inches. This was achieved by laying the bottom course in widths of 12 and 13 feet, the middle course in widths of 13 and 11½ feet, and the top course in two 12-foot widths. A Huber 10-ton tandem performed the rolling.

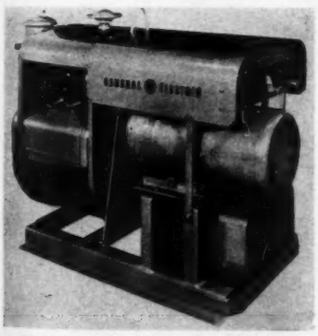
Personnel

Amis worked a single 10-hour shift 6 days per week. There were 9 men at the plant, 7 on the road, and 14 driving the trucks. The contractor's forces were directed by John R. Waugh, General Superintendent.

Albertis Montgomery was Resident Engineer on the job for the Oklahoma State Highway Department. The project was located within Division 3, of which Earl Anderson is in charge. C. A. Stoldt is Director of the Department; G. H. Bittle is Chief Engineer; and J. J. Stobaugh, Jr., is Construction Engineer.

New DC Arc Welder

A new 200-amp engine-driven dc arc welder with a 60 per cent duty cycle has been announced by General Electric Co., 1 River Road, Schenectady 5, N. Y. Type WD-42AGW has a current range of 40 to 250 amp, and can be used with a variety of electrode sizes for repair, maintenance, and construction work operations.



Consisting basically of a G-E Type WD42 generator and a Wisconsin air-cooled engine, it is designed to fit cross-wise in a standard pickup truck. Optional equipment includes a trailer equipped with fittings for pressure lubrication.

Forced ventilation keeps internal temperature within safety limits when the welder is operated on a 60 per cent duty cycle at rated load. In addition, tests indicate that heavy overloads for short periods do not produce harmful results.

Either the generator or engine can be removed easily for overhaul, and replaced by a standby unit. Since the engine is air-cooled, coolants or antifreezes are not required.

A vacuum-type device saves gasoline by idling the engine when welding is not being done.

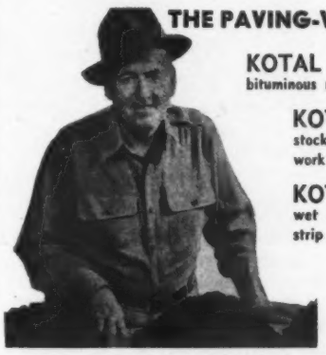
Further information may be secured from the company by requesting Bulletin GEC-917. Or use the Request Card at page 18. Circle No. 353.

Booklet on Stud Fasteners

A 35-page booklet on methods for securing insulation materials has been released by Nelson Stud Welding, a division of Gregory Industries, Inc., Lorain, Ohio. It includes detailed information, with pictures and diagrams, on the types of end-welded studs for use with various types of insulation. Stud fasteners and insulation are classified by types and uses to aid in selection of materials and fasteners for obtaining the desired results.

Application procedures are given for each type of stud fastener. The booklet includes complete information on the methods for supporting reinforcing materials used in the pneumatic application of concrete, and shows how that process can be used over insulation materials. Nelwelder generators and battery units are also described.

This literature may be obtained from the company, or by using the Request Card at page 18. Circle No. 253.



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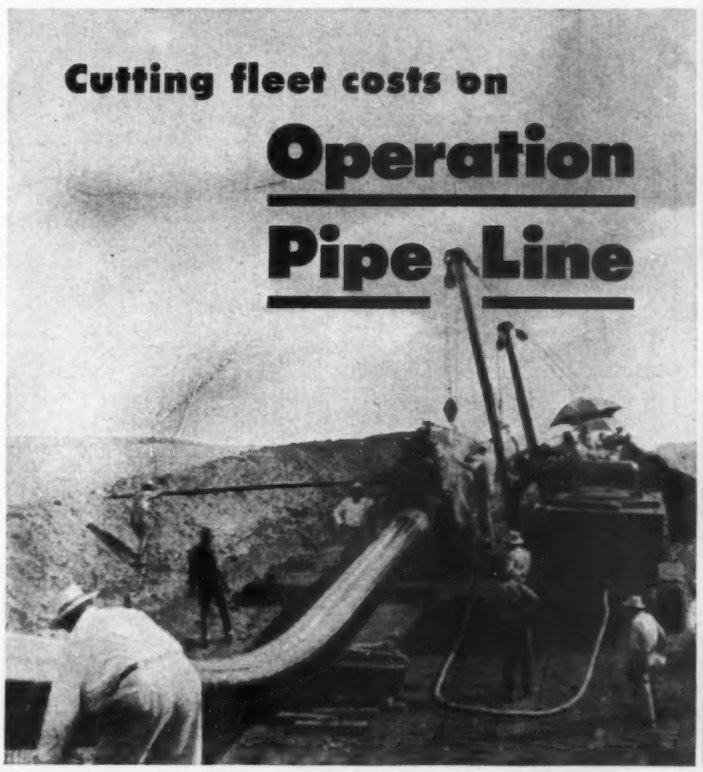

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Motor Oil

. . . on tougher fleet jobs.

• The G. G. Griffis Construction Company, Tulsa, Oklahoma, has a far-flung reputation for tackling the tough jobs and getting them done on schedule. Sparking this organization is its president, Mr. G. G. Griffis who is shown above (left) with Mr. J. R. Welsby of Standard Oil. With 33 years pipe lining experience in all 48 states, Mr. Griffis knows how to get the most out of his equipment. He has this to say about his experience with STANOLUBE HD-M, Standard Oil's new and better heavy-duty motor oil:

"We push our engines hard on all jobs, and they must be able to take punishment. With your STANOLUBE HD-M we have not had to worry about any breakdowns due to faulty lubrication, and that's important when you've got schedules to meet. What's more, our engines have stayed cleaner and in better shape which has cut down overhaul bills."

Make the experience of Mr. G. G. Griffis your basis for trying STANOLUBE HD-M. This new and better additive-type lubricant, combining more effective detergent-dispersant action with greater oxidation stability, will keep deposits and wear at a minimum in all types of fleet engines under the toughest of operating conditions.

Your nearby Standard Oil Office and warehouse stocks STANOLUBE HD-M for fast local delivery. Here, too, is headquarters for your Standard lubrication specialist. Call him today. Or write: Standard Oil Company (Indiana), 910 South Michigan Ave., Chicago 80, Ill.

STANDARD OIL COMPANY
(Indiana)

STANDARD

Portrait in Print

Verne Watson: Hole-Diggin' Man

By RAY DAY

In a characteristic pose, Verne Watson takes one of the many long distance calls which come into his Fort Worth office every day.

• IN a big meeting room of Texas A. & M. University one spring day last year, a powerfully built sandy-haired man strode to the speaker's rostrum to address the cream of Texas' engineering crop. No engineer, no college professor, not even a diplomat was this purposeful man who had been invited to appear on the program to give a contractor's view on foundation design. And what he had to say to the engineers could be boiled down to this one sentence: If you guys believe two steel H-piles will carry as much load as a 5-foot 6-inch belled footing, you're nuts! Instead of throwing him out on his ear, well known bridge engineers looked at each other and said, "Maybe he's right. He certainly ought to know."

At the new $35,000,000 General Motors assembly plant midway between Fort Worth and Dallas, the same man was called upon to dig some of the difficult footing holes. On another occasion, when the Veterans' Administration started nationwide investigations to see why many a new housing project was cracking up structurally, the sandy-haired man growled, "Why the hell does the VA blame the contractors? Why not put the blame on faulty foundation design, where it belongs?"

This rugged individualist, who has the temerity to call a lousy design a lousy design in so many words, is individually responsible for the ever-increasing use of drilled foundations over Texas and over the nation. He is Verne Watson of Fort Worth, who with his brother Paul heads up a crack organization called Watson Foundation Co. Working ceaselessly, day, night, Saturdays, Sundays, holidays, and any other time, Verne Watson is doing much to bring a new concept of foundation design to construction.

Not too long ago his phone rang with one of the numerous long-distance calls he handles daily. This one was from the project manager for a large eastern concern, on location on a bridge in Ohio.

"Verne", he said, "we're having trouble. We need to go down 45 feet in shale with a 6-foot hole. Can you do it, and how much should it cost?"

Watson, thoroughly familiar with that part of the country, said, "Don't spend more than $1,000 a hole."

The project manager hit the ceiling. "We're spending twenty times that much!" he bellowed. "Do you mean to tell me we're wasting money? That we don't know our business?"

"I'll take a contract on those holes at $875 apiece", Watson said. "It's up to you to fish, or cut bait."

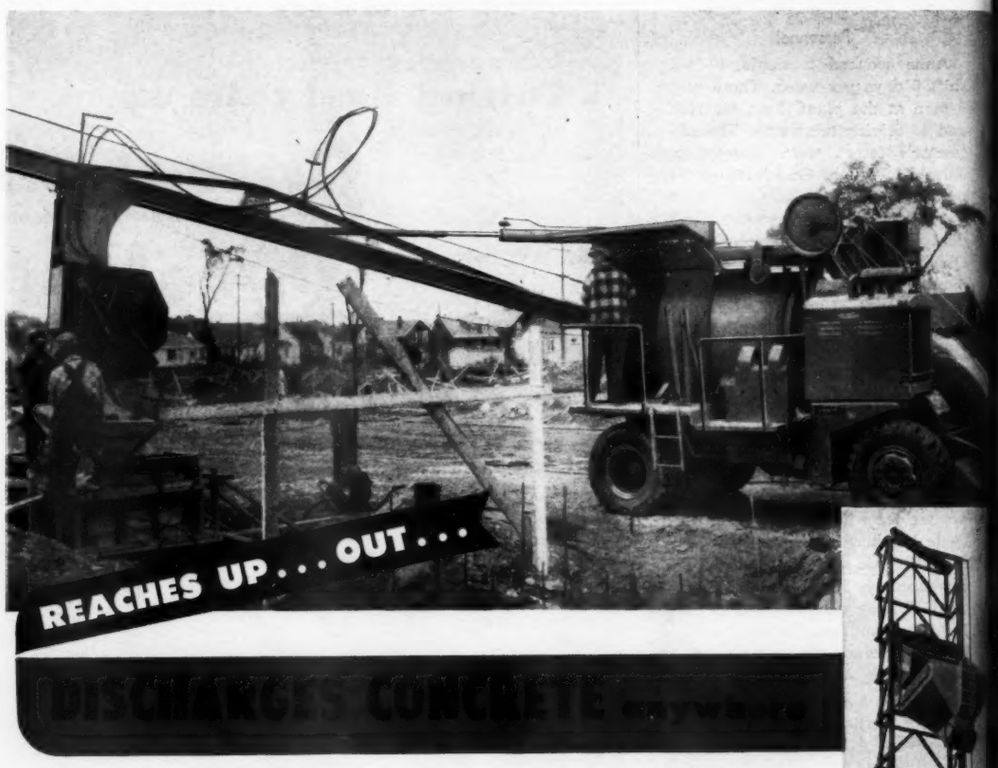
The project manager acted quickly. Watson sank the holes in an average time of 4 hours apiece.

Is Not Arbitrary

In spite of many an outspoken clash with traditional concepts of foundation design, Watson is one of the least arbitrary men on earth. He has found out a lot about the behavior of soils and the crust of Mother Earth, and the more he's found out, the more he realizes what he doesn't know. He freely admits working on certain aspects of soil behavior to which he has not, after much study, found a definite answer. Few photographers have ever taken his picture out on the job, because he is superstitious enough to feel that, even with everything under control, this might cause something dreadful to happen.

Yet Watson is recognized in his home state, and in many others, as a man who gets the tough ones done.

Watson's theory of foundations is as simple as it seems to be sound. Over a long period of years, Watson observed that the ground contracted during long dry spells, and swelled or expanded when wet cycles came. This phenomenon was especially



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mixes and pours concrete for buildings, pilings, bridges and culverts . . . paves highway and airport strips . . . batches into trucks . . . discharges concrete into overhead forms, hoppers, chutes. It's never "grounded". Elevating boom reaches up and out 60° . . . bucket discharges at a height of 21 feet (higher with special boom). Power-controlled boom also swings in a 160° arc . . . is self-locking, holds in any position for accurate spotting and discharge.

CONTROLLED-DISCHARGE BUCKET

dumps anywhere along the 25-foot boom. Clamshell-type door on bucket is hydraulically operated . . . can be opened or closed at any time for gradual discharge. Water-level capacity is 24 cu. ft. That's more than ample to hold the full 16 cu. ft. batch of concrete, plus 10% overload.

48½-FT. DISCHARGE HEIGHT WITH TOWER

On the Koehring 16-E, the elevating boom is interchangeable with a 40 or 60-foot tower . . . gives you discharge heights up to 48½ feet for pouring high columns, piers, decks and floors. Hoist bucket discharges automatically into 40 cu. ft. overhead hopper. Tower is raised, or lowered into carrying position, by the same hydraulic ram used on elevated boom.

This versatile Koehring 16-E easily mixes and distributes up to 50 cu. yds. of concrete per hour. Also check its 6 m.p.h. rubber-tired mobility. Ask, too about Koehring 34-E *twinbatch*.

KOEHRING HEAVY DUTY

KOEHRING *twinbatch* PAVERS

DUMPERS • CONSTRUCTION MIXERS • CRANES • EXCAVATORS • DRAGLINES • HYD-JACKS

KOEHRING Company, Milwaukee 16, Wisconsin Subsidiaries

true in clays, gumbos, and other such soils which engineers call "plastic".

"Plastic hell!" Watson explodes. "That ground moves and breathes, the same as your chest moves in and out. I can't control the movement of your chest, and I can't control the natural movement of the upper part of the ground. But I can sure build a foundation that will eliminate most of the structural cracks in a building you place on that soil."

Watson has pretty well proved that point. Many bridges are carrying traffic without any up-and-down movement on footings which his company built. Many parts of the Houston expressway are on bridge structures which he, along with other drillers like McKinney Drilling Co. and Hugh B. Williams, had a part in. His own home is a long low type peculiarly vulnerable to structural cracks, but Watson engineered his own foundation piers so soundly in bad soil conditions that the house is free from any evidence of cracking.

In heavy mud like this, Watson doesn't hesitate to use augers. In other formations he turns to bucket-type rigs.

Started the Hard Way

Watson's ideas have been many years in the process of development, and his growth has been the hard way. Born in Missouri, the Watson family came to Texas while Verne and his brother Paul were still young. After a rather uneventful life during his youth, and a still less eventful hitch in the Navy during World War I, Verne landed in California. What exactly caused him to come back to Texas is not clear, but he and Paul decided to come back and pick up a small house-moving business which was still in the family.

In those days, methods were somewhat more than primitive, and house moving was a dirty back-breaking job. In many cases, quite intelligent thinking was necessary to rig up the necessary underpinning to keep a house from cracking up when it was raised. Holes had to be dug for this underpinning, and there was no equipment to dig it. After many unsuccessful attempts to get some kind of a machine to take over this hard work, Watson decided to build his own. He went to a banker to borrow the money. The banker's answer added another occasion to those on which Watson had been told, "You're crazy, Verne."

But he got his first rig built, nevertheless, back in the early '30's, and so well did he build it that the rig is still giving good service today. Others followed. Today he has eight in operation. The ninth, which is now under construction, will dig a 10-foot-diameter hole in clay, will develop up to 450,000-inch pounds of torque—enough to make a corkscrew out of a 4-inch-high alloy-steel bar—and will perform miracles of work. All the big rigs are mounted on Brockway and FWD trucks, while a few smaller rigs are mounted on 6 x 6 trucks. One big drill-head attachment fits a 2-yard Lima machine.

As a matter of fact, this latter machine is an indication of which way Watson's business will head in the future, if he can control it. For Watson would like to lower the cost of foundation work even further by renting to the average contractor a small drill-head unit, self-powered, which the contractor could mount on conventional equipment common to construction jobs.

The more Watson worked in the ground with his equipment, the more he realized that the movement of the earth's crust was limited to the upper layers, where moisture fluctuates. Down deep, where the moisture content is more permanent, little movement takes place. Watson began to experiment on his own with belled-bottom drilled shafts set down on this solid material. He found that this type of foundation moved little, if at all. When engineers and designers became sufficiently interested to specify his type of foundation, test loads up to 186 tons were placed on several installations. They stood up.

Watson sees a particularly vermilion type of red when engineers maintain that wood piles or steel

(Continued on next page)

BUCKET TRAVELS 183 FT. PER MIN.

on horizontal boom (92' per min. elevated) . . . pours controlled batch anywhere along boom. Simultaneous bucket travel and boom swing speed distribution with 16-E.

BIG-PRODUCTION 34-E *twinbatch*

hits top output of 86.7 batches an hour (60-second mixing time). This reserve production capacity picks up lost time from normal delays, assures fast schedules.

"TIMELY", PRECISION-FINISHING

Koehring Longitudinal Finisher can operate at almost twice the speed of a 34-E paver, produce mechanically-accurate slabs, 8 to 30', with uniform crown transitions.

JOHNSON • PARSONS • KWIK-MIX

Flexible All-Welded Roadbuilders Bin gives you a portable batch plant for 2, 3 or 4 aggregates, or converts to transit-mix (shown) or central-mix plant for bulk cement and 2 or 3 aggregates. Can be equipped with 1 or 2 multiple material Hi-Speed Batchers, size 34 Roadbuilders Batcher, or truck-mixer charging batcher in 2, 3 or 4-yd. sizes. Bin available with 2, 3 or 4 compartments, 50 to 125 cu. yds. Also: silos, elevators, buckets.

C. S. JOHNSON *(Koehring Subsidiary)*
Champaign, Illinois

Saving important seconds on every batch of concrete, tilted Flow-Line Discharge Chute pours full 12.1 cu. ft. batch in 7 seconds. Kwik-Mix 11-S Dandie® also has side or end discharge, 2 or 4 wheels, and special tower attachment. Other sizes: 3½-S to 16-S. Also check Kwik-Mix bituminous, tilt and non-tilt plaster-mortar mixers . . . and Moto-Bug® (power wheelbarrow) shown here. Ask your Kwik-Mix distributor for all facts.

KWIK-MIX *(Koehring Subsidiary)*
Port Washington, Wis.

On utility, drainage and irrigation trenching, you can dig up to 18½ ft. per min., 13 to 31 in. wide, in depths to 6 ft. with this 202 wheel-type Trenchliner. It has: square or round-bottom buckets; quick-change bucket fronts with cutting lips or "Tap-In" teeth; 16 or 20-in. crawler shoes; gas or diesel engine. Tile box and chute optional. Also check 215 wheel-type; 3 big ladder-types, full crawler mounted; utility Trenchliner on rubber.

PARSONS *(Koehring Subsidiary)*
Newton, Iowa

Y70

H-beams, under similar conditions of soil, will carry the same load as a drilled-in-place foundation.

"Now, look", he explains. "Here's your pile. It's got a pointed tip, unless it's broken or bent or broomed so wide you could sweep up this whole damn warehouse with two stobs . . . and get complete coverage. Let's assume you've been lucky, and have driven the pile down to firm bearing material. Even so, all the material around and below that pile is disturbed.

"On the other hand, here's a drilled footing. It's gone down easy, without disturbing the soil. Its footing is down on undisturbed good bearing. Maybe we'll under-ream that footing . . . although I don't think we should if it's in rock. At any rate, we fill the hole up with sound good concrete. What happens? The concrete, with its hydrostatic load, puts just the right gentle pressure on that soil. You've got something substantial and firm, and something that won't give. How can you say that the pile, driven under typical conditions with its limited bearing area, can compete in value with the drilled caisson?

"And how about your lateral loads? How about the terrific maintenance cost of pile installations, especially on railroad bridges, where some of the wood piles have been replaced three and four times? How about costs?"

The latter is a particularly strong point, so far as Watson is concerned. On the Dallas-Hampton-Innwood Bridge, conventional-type pile foundations were estimated at $186,000. The estimated time of installation was 9 months, because conditions were not too good. Watson bid his type of foundations in at $96,000, and was through in 35 working days, covering a period of 2 months.

On the Houston expressway, one foundation job which had been planned for a year's work was finished by Watson in exactly 17 working days, at a saving to the Texas Highway Department of about $94,000. Engineer-Manager W. J. Van London added, "And who can estimate that far ahead the enormous saving in efficiency, in getting this facility finished and in operation?"

Creatures of Habit

Why do engineers continue, so many times, to ignore the lower-cost new development in favor of obsolete and old methods?

To Watson, who is a more-than-average-developed student of human behavior, the answer boils down to the fact that men are creatures of habit. They hate to change their ways. One type of construction has been practiced in one way in some industry for 100 years. Its engineers are reluctant to change.

And, lest that statement might be interpreted by some thin-skinned engineer to be an indictment of engineers, Watson is equally frank in admitting that contractors and construction men hate to change. He is constantly searching his own house and business for places to make improvements, and when he inaugurates his schemes, he invariably meets with resistance from some of his own men.

"A man goes to the same barber for 10 years", he explains. "If you suggest to him that another barber two blocks away could do him as good or a better job, he'll usually take it as a personal criticism of his judgment, and react accordingly."

For this reason, Watson is familiar to resistance in all its forms. Nobody knows better than he that it takes years to introduce new ideas. But he is in a good state for his business. The Texas Highway Department, for example, is one of the finest engineering organizations in the nation, and its bridge engineers, under Randle Alexander, were among the first to accept drilled foundations and to specify them, at least as alternates. It was a happy day for Watson when the first job, a bridge at San Angelo, was designed with drilled footings as an alternate.

SOLVE YOUR HAULING PROBLEMS WITH
A "TRANSPORT TRAILER"
Capacities through 75 Ton—Semi and Full Trailers

CARGO CARRIER MODEL GPX (Semi) with Tandem Axles

PATENTED TANDEM AXLE ASSEMBLY—Featuring unusual lengthwise and sidewise wheel accommodation to irregularities in the road. Use of full width tubular forged, heat treated axles with CAMBER.

FRAME—Constructed of beam sections throughout, electric welded. A ruggedly strong and efficient unit with minimum weight.

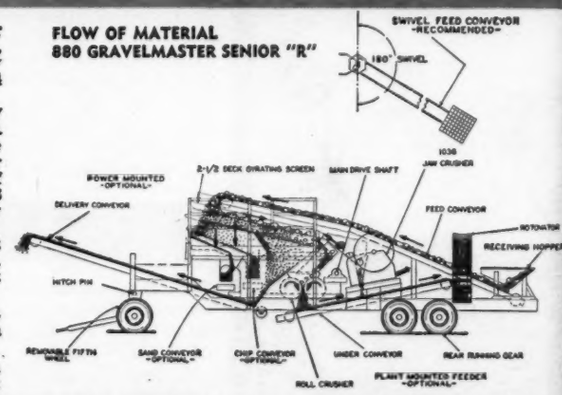
TRANSPORT TRAILERS, INC.
TRANSPORTATION ENGINEERING A SPECIALTY
CEDAR RAPIDS, IOWA, U.S.A.

60,000 TONS 24 DAYS 4 PITS

RAY FISCHER'S NEW UNIVERSAL 880 GRAVELMASTER SENIOR "R"

Operating his Universal Senior "R" in four separate pits from Pipestone to Minneapolis, Ray Fischer of Fischer Construction Company produced 60,000 tons of ¾" specification in 24 days which included moving and set-up.
The Universal Senior "R's" BIG 10" x 36" jaw crusher, BIG 30"x22" roll crusher, and EXTRA LARGE 4'x12' 2½ deck screen made it possible for Ray Fischer to pour out this tonnage under a wide range of pit conditions. Percentage of crush varied from 15 to 43%. Frequently 6 tons a minute were pouring off the delivery conveyor. **That's production!**
The modern, streamlined design keeps weight within state highway limits . . . enables fast, easy moving from pit to pit . . . affords fast set-up. **That's portability!**
It's easy to see why Ray Fischer placed a second Universal Senior "R" into operation the same season.
Before you buy or specify, get the low-down on the many new Senior "R" features that combine top capacity with ready portability to help you win more bids . . . earn greater profits on every job. Ask your Universal distributor for details. Write today.

FLOW OF MATERIAL
880 GRAVELMASTER SENIOR "R"



UNIVERSAL GAVE CEDAR RAPIDS ITS ORIGINAL FAME FOR QUALITY CRUSHERS IN CEDAR RAPIDS SINCE 1906

UNIVERSAL ENGINEERING CORPORATION Division of PETTIBONE MULLIKEN CORPORATION
620 C Avenue, N.W., Cedar Rapids, Iowa
Phone 7105
4700 West Division St., Chicago 51, Illinois
Phone Spaulding 2-9300

Watson is as eager and open for new knowledge as a high-school freshman. Nothing pleases him better than when tests are made on his foundations. He feels certain that drilled foundations can more than compete for themselves on any factual basis. On a recent job, a 16-inch square concrete pile was driven to a penetration of 45 feet, to compare its bearing qualities with a 20-inch round drilled caisson poured full of concrete. The pile started sinking when 17 actual tons of load had been applied. The drilled poured foundation took 186 tons without a trace of movement. Such examples as these are what make Watson so eager to have more drilled footings used, because he is certain in his own mind that they are better and cheaper.

No drilled caisson, says Watson, is better than its point of final placement and its insulation of the main structure from the moving earth. Watson has taught building contractors how to insulate their building beams from ground pressure by building a shallow trench underneath, and filling it with sawdust, crushed peach seeds, walnut shells, or anything similarly organic which will, in time, decompose. With the bottom of the foundation down on nonmoving soil, and the beams insulated by the void against moving ground, the structure is free from cracks. He has even backfilled around some of his columns at times to put in the insulating organic material as shear protection. He can build varying degrees of skin friction into his foundations, and he is not particularly scared of that nemesis of builders: quicksand. It's simply something fluid to Watson.

Watson will admit, however, if you press him hard enough, that his toughest job was down at Kennedy, Texas, on a little innocent-looking bridge being built for the Texas Highway Department by Heldenfels Bros., of Corpus Christi. The foundations for the structure had been designed for 16-foot penetration. Since the job was over 300 miles away, Watson didn't even want to figure it, and the work was let to a local foundation man.

Four months later, both the local man and the prime contractor were still trying to complete that first hole. Heldenfels called Watson and told him of his trouble. At the word "trouble", Watson's eyes lighted up and his face began to twitch like a hound dog on a hot trail. If there is one thing Watson loves, it is a tough job of work. He quickly accepted, and started to mobilize. He finished the job and finished it successfully, but to complete those 16-foot piers he went 76 feet deep through 37 feet of fluid subsurface conditions.

One of Watson's rigs working on the new General Motors plant, Arlington, Texas.

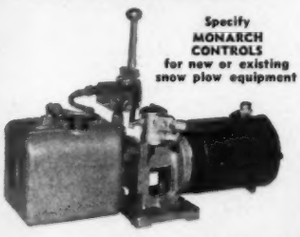
It would take much of Watson's joy of his work away from him if his organization expanded to the point where it was impossible for him to figure personally in all the toughest field problems. His organization could easily get that far out of hand. For one of Watson's most cherished statements is, "I haven't seen the one that's so tough we won't try it." In Texas, a statement like that is tantamount to asking for a fight. His telephones keep up an endless jangle all morning long, with invitations from all over the country to prove that he means it.

At the present time Watson is turning much business away, and is encouraging his competitors to take their share. But he still hasn't gotten over one dignified old gentleman manager of a well known contracting firm who got him to sketch exactly how he would do a particularly tough foundation job. Watson sketched it, turned in the figures, and did not—repeat, did not—land the job. The polite old gentleman took Watson's plans and did the job himself.

At present, Watson and his brother Paul still own and actively manage the business. Paul's strong point is administration and finance. Verne's is operation and management. Verne's son, John V. Watson, is in

(Concluded on next page)

POWER HYDRAULICS FOR SNOW PLOWS



Specify MONARCH CONTROLS for new or existing snow plow equipment

- Clutch operated
- Thousands in use
- Fit all trucks
- Fan belt or electrically driven
- *Write Hydraulic Division*

MONARCH ROAD MACH. CO.
324 North Front Ave., Grand Rapids 4, Mich.

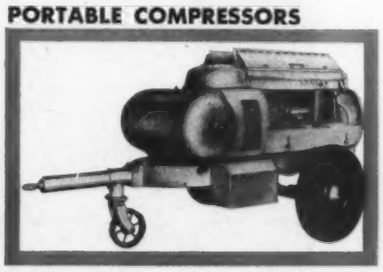
Use JOY AIR-POWER and TOOLS

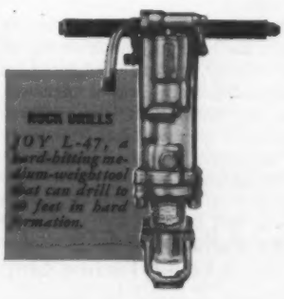
for all-around best performance

ON THE JOB

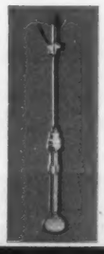
JOY Portable Compressors and "Silver Streak" Air Tools make a highly efficient, time-and-money-saving team—the most modern units you can put on the job. They're light, compact and easy to handle, yet ruggedly built for real heavy-duty service. JOY Portables are available in seven sizes, ranging in capacity from 60 to 630 CFM at standard pressure. JOY Air Tools feature the exclusive "Dual Valve" that makes air do more work, plus cadmium plating for better lubrication, closer tolerances, and prevention of rust and scoring. • Let us show you how JOY equipment can reduce your costs, and produce more work per man-hour. *Write for bulletins, and ask for an actual demonstration.*

PORTABLE COMPRESSORS





SHEETING DRIVERS
JOY Q-81, an adaptation of the K-81 for driving wood or light steel sheeting.



BACKFILL TAMPERS
JOY C-35, an easy tool to handle, yet delivers powerful blows for faster tamping.

SPADERS
JOY M-2, a light tool for digging in clay, shale, hardpan, or hard-frozen ground.

Consult a Joy Engineer

WSD C2040

JOY MANUFACTURING COMPANY
GENERAL OFFICES: HENRY W. OLIVER BUILDING · PITTSBURGH 22, PA.
IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO

Portrait in Print

the general superintendent's chair, and is rapidly preparing himself to take an even more active part. A graduate mechanical engineer, he is doing much to iron out bearing and other difficulties on some of the rigs. True to form, Verne even has a solution to that. He says, "You can eliminate bronze and figure a strengthened steel-alloy bearing until your brains are worn out, and if the operator is too damned lazy to throw a little grease once in a while, it'll still not be any good."

Foundations and the drilled type of support continue to be Verne Watson's first love. He has no hobbies except his work. He took a hunting trip to Colorado last fall to please his son Jack, who is an expert on guns. Verne spent most of the trip explaining to the Colorado guide how to drill and under-ream a caisson in nothing flat.

Tough moving jobs still interest him, however, and a few years ago he got nation-wide publicity by setting a 17-ton boiler on top of Fort Worth's highest building. His firm now has an erection contract at the Bell Aircraft plant to set up a 7,000-ton Erie press weighing over 900,000 pounds. Each tie-down bolt and nut alone weighs over 22 tons. The monstrous press platens, so big they could not be transported through the streets lying down, had to be set up on edge to haul. Watson was bonded for $350,000 to do that job.

His men say that Watson drives himself twice as hard as he does them. He is in his office every day, usually including Sunday. The notes for this portrait were made on Saturday. Construction in Fort Worth was tied up, but Verne Watson was solving problems and doing business by the handful. One of his rigs was headed out of the yard for a Sunday job in Dallas to lift a transmission tower and lines bodily, to raise it. To Watson, Sunday was the right day to get the 66,000-volt power on those lines cut off while the raise was made.

But Watson seldom says anything about the tough problems on top of the ground. To him, the interesting and unknown problems of engineering lie underneath the surface, where no man can see. It is there he does what he calls his most interesting work.

New Adjustable Clip Levels Furring Strip

Furring channels for suspended ceilings are said to be easily leveled with a new adjustable clip made by the Suspended Ceilings Division, The Sanymetal Products Co., Inc., 1705 Urbana Road, Cleveland, Ohio. The E-Z clip works with No. 8 standard wire hangers used in suspended-ceiling construction.

First step in the installation is slipping the hanger wire through a metal eye on the clip. The clip is then held at approximately finished-ceiling level by tightening a small wing nut, which in turn tightens the hanger wire against a double V-spring steel clip. The 1½-inch channels are then installed by raising and lowering a small locking gate on the lower half of the clip. This locking gate also holds the channel in a permanent upright position. The channels are held only on the top flange, which leaves the lower half free to receive other furring and nailing channels which require exact installed centers. This eliminates the hazard of hanger wires being bumped right or left and destroying the level, the manufacturer points out.

By loosening the small wing nut, the furring channels can be raised or lowered to obtain an exact level. When the wing nut is again tightened, the wire hanger can be bent around special notches in the sides of the clip without losing the level.

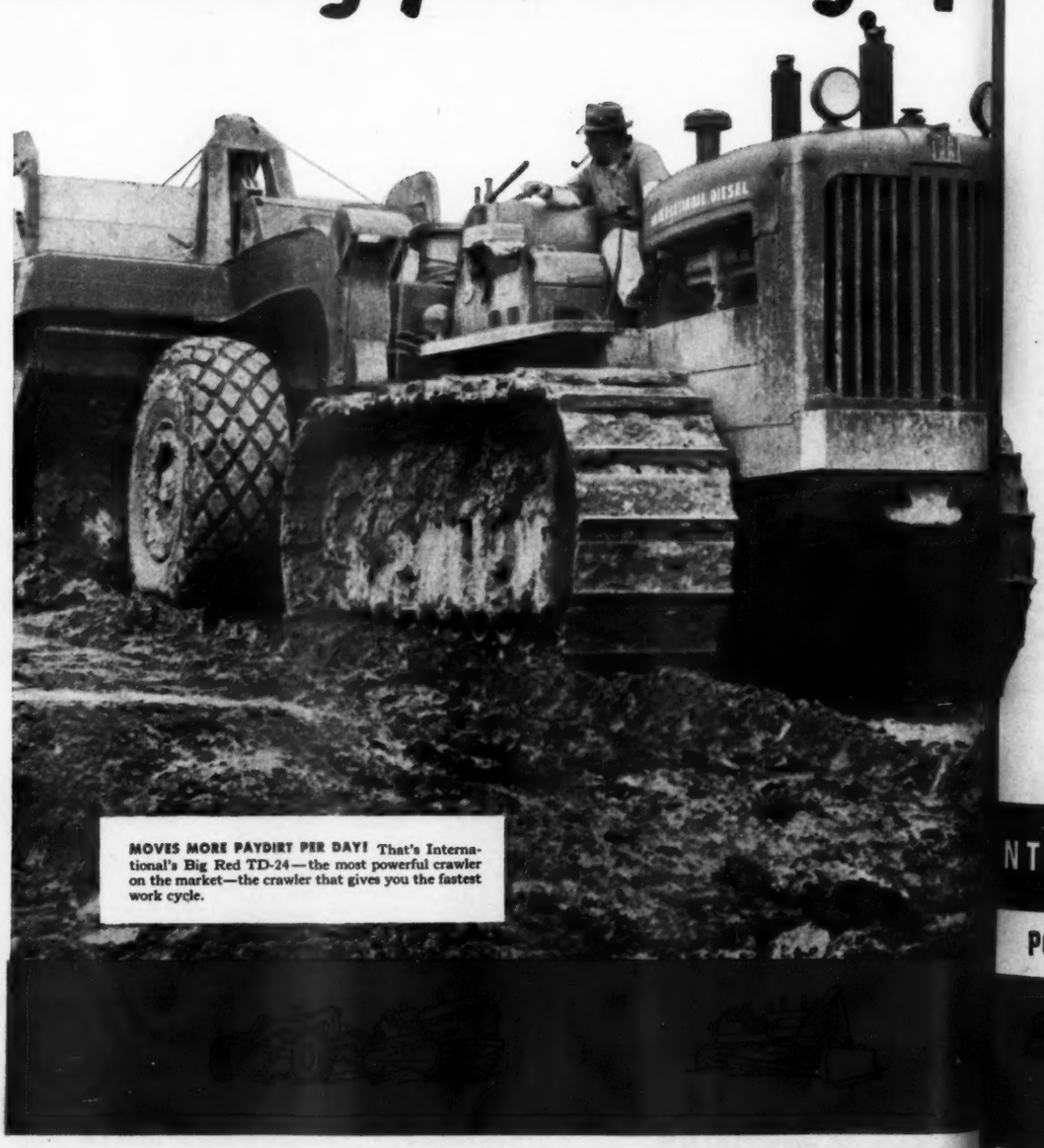
Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 266.

Electric-Hand-Saw Safety

"Electric Hand Saws" (circular-blade type) is a new data sheet published by the National Safety Council. A compilation of experiences from many sources, it lists fifty suggestions for safe operation of the saws. Reprints of Data Sheet D-Gen 49 may be obtained from the National Safety Council, 425 N. Michigan Ave., Chicago, Ill.

"Sounds silly but we had to hire him for this bridge contract."

Keep 'em Working in the big year coming up



MOVES MORE PAYDIRT PER DAY! That's International's Big Red TD-24—the most powerful crawler on the market—the crawler that gives you the fastest work cycle.

BTEA Fund Survey Completed

A comprehensive survey of welfare funds in the building trades in New York City has been completed by the Building Trades Employers' Association, 2 Park Ave., New York 16, N. Y., an organization of 1,000 general and specialty contractors. The only continuing survey of welfare funds in the building industry in the United States, this report reveals for the first time the annual dollar volume of employer contributions and benefits paid, and supplements an earlier study published last year which covered only the basic structure of 20 funds.

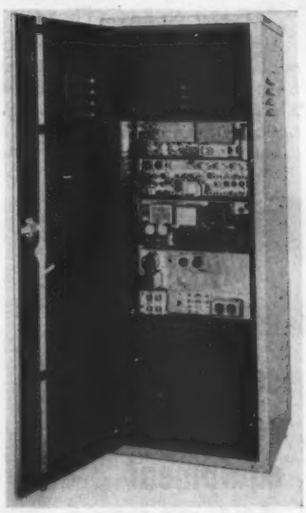
All the funds are financed by employer contributions, largely by contractor members of the BTEA. Most of the contributions amount to 3 per cent of payroll, with a few funds receiving 4 per cent. All of the funds are administered by a joint board of trustees composed of union and employer representatives. In addition to these welfare funds, there are pension funds from employer contributions which were established for some of the trades by collective bargaining in 1950 and 1951.

The report, complete with tables of breakdowns of eligibility rules and types of benefits, is available to employer associations and unions, public officials, and colleges and research organizations interested in the subject and management of welfare funds.

A Remote-Control Base-Station Unit

A remotely controlled base station, complementing its line of 450 to 470-mc 2-way radio equipment, has been introduced by Motorola, Inc., Communications & Electronics Division, 4545 W. Augusta Blvd., Chicago 51, Ill.

This equipment may be used as an automatic relay station to increase



the area of operations of a base-to-mobile communications system or to extend the length of the signal path between the end points of a point-to-point radio-relay system. It may also be installed some distance from the point of audio termination. Such a condition might be dictated by a high ambient noise level or poor signal-propagation characteristics at the most convenient location. Proper location of receiver and transmitter may increase the effectiveness of a system many times, the company points out.

The base station is housed in a weatherproof cabinet suitable for pole mounting. Features include Sensicon receiver circuit, Permakay filter, instantaneous deviation control, and capacitance discriminator.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 262.

Interchangeable Panel Form

A pre-assembled framed panel for concrete-form erection is described in a catalog issued by the Atlas Compo Form Division, Irvington Form & Tank Corp., 20 Vesey St., New York 7, N. Y. The interchangeable panels are made of exterior-grade or plastic-coated plywood fastened to a steel frame. The design load is 900 pounds per square foot. According to the manufacturer they can be used in various combinations to give forms of desired size and shape. The same panels may be used for slab construction by laying them across the joists without nailing or fastening. Especially adapted tie bars, wale clips, and wedges are available from the manufacturer.

This literature may be obtained from the company, or by using the Request Card at page 18. Circle No. 272.

C. I. T. Corp in the South

C. I. T. Corp., New York, N. Y., affiliated with Commercial Investment Trust, Inc., and a leading industrial finance organization, has opened regional headquarters at 2806-10 Sterick Bldg., Memphis, Tenn. The office, under the direction of W. G. Cathcart, Vice President, will provide service to constructors, manufacturers, and dealers located in the states of Arkansas, Mississippi, Louisiana, and western Tennessee.

Here's help... where and when you need it... with your International Industrial Distributor's ready service and parts departments

Your crawler tractors have to pay off with more work done per day, more days worked per year.

That means speed and power. The ability to stay on the job. Minimum downtime.

And it also means fast maintenance service at your call, when and where you need it.

That's your International Industrial Distributor's service—service that includes

TRAINED "DIESEL DOCTORS"—factory-trained specialists in maintenance and overhaul.

PROMPT FIELD SERVICE at your job site to help keep your equipment working, to get it back to work faster, to cut costly downtime on the spot.

COMPLETE SHOP FACILITIES for major work—you're never far from an International Distributor's shop, no matter where your equipment goes.

QUICK PARTS SUPPLY from your distributor's fully stocked parts department, backed by International Harvester's network of strategically located parts depots (in size and scope, exclusive in the industry).

Isn't this *complete* service a mighty good reason to get International *"Power that Pays"* for the hard-working years ahead?

INTERNATIONAL HARVESTER COMPANY
CHICAGO 1, ILLINOIS

YOU NAME IT—your International Industrial Distributor has it in his big, efficient parts department. And if he hasn't, he can get it fast from his nearby International Parts Depot.

"HEART SPECIALIST!" A crawler's heart is its sturdy fuel pump. It seldom needs attention. When it does, this "diesel doctor" operates with precision instruments in a special dust-free room.

HERE'S HELP WHEN YOU NEED IT. Skilled, experienced mechanics equipped with the right tools for doing major maintenance fast at your International Distributor's shop.

ON THE JOB! Here are an International Distributor's field servicemen, on the job at the job site installing an overhauled transmission. A phone call gets this kind of service.

INTERNATIONAL

INTERNATIONAL HARVESTER

POWER THAT PAYS

Folder on Radio-Phone

A folder on a portable 2-way radio-telephone has been released by the Hallicrafters Co., 5th & Kostner Aves., Chicago 24, Ill. The Littlefone hand-carried model has a 2-watt antenna output, weighs 9½ to 14 pounds, and is powered by dry or wet rechargeable batteries. The central-station model has the same specifications but is ac-operated.

This literature may be obtained from the company, or by using the Request Card at page 18. Circle No. 328.

On the job or in the shop, Hypressure JENNY will strip mud, muck and grease from your equipment *10 times faster and better* than you can do it by solvent-brush-and-scraper methods. And JENNY cleans right down-to-the-bone . . . will save up to 40% of equipment "down-time" by removing speed-retarding dirt and grease before your mechanics start repairs. That means 40% more "profit-time" for you.

JENNY reduces labor costs as much as 90% on cleaning brick, tile, masonry, concrete, and in preparing bridges, structural work or machinery for painting.

Hypressure JENNY is sturdy . . . portable . . . economical and easy to use. Ordinary labor can operate it. There is a model to suit your needs.

WRITE TODAY for complete information and prices. No obligation.

HYPRESSURE JENNY DIVISION
HOMESTEAD VALVE MANUFACTURING COMPANY
P.O. BOX 30 CORAOPOLIS, PA.

Prizes for Essays On Better Highways

Do you have any bright ideas on how the nation should set about obtaining an adequate highway system? If so, here's a reminder that you still have a chance to get not only the roads you want, but a few thousand dollars thrown in. Just write an essay before March 1.

With the intention of stimulating more nation-wide thinking, discussion, and understanding of the facts of our current highway requirements, General Motors Corp. is sponsoring a national essay contest and offering $194,000 in 162 national, regional, and state cash awards. The essay subject is "How to Plan and Pay for the Safe and Adequate Roads We Need". There is to be a first prize of $25,000; a second prize of $10,000; a third prize of $5,000; and three honorable mentions of $3,000 each. In addition, awards of $2,500 will be made for the best essay submitted from each of nine regional areas. First-place winners in all of the 48 states and the District of Columbia are to receive $1,500 each. There will also be two honorable-mention awards for each state.

The competition, which closes at midnight on March 1, is open to any resident of the United States, except contest judges and their immediate families. Helpful background information about the highway crisis is contained in "The General Motors Better Highways Awards Facts Book". A copy of this book, containing an official contest-entry form, may be obtained from any GM dealer or by writing to General Motors Highway Awards, General Motors Bldg., Detroit 2, Mich.

Spiral Pipe Reamer

A spiral pipe reamer has been added to the line of pipe tools made by The Ridge Tool Co., Elyria, Ohio. It cuts inside burr from pipe and conduit and can also be used to cut holes in sheet metal. Reamer capacity is ⅛ to 2 inches. It is furnished with ratchet handle, but the spiral-reamer unit alone may be purchased for use in the ratchet handle of Ridgid No. OOR threader.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 279.

meeting the need for extra width with the
JAHN MODEL 410 WIDE PLATFORM TRAILER
The Jahn 410 Trailer is our answer to your problem of hauling extra wide equipment. Here is 8-feet of platform width to safely carry rolling stock from job-to-job.
The platform has been designed for easy loading with the rear half of the trailer sloped to a gradual incline . . . no more time consuming difficulties in getting your equipment aboard outmoded and unsafe trailers. The Jahn 410 is quick, safe and sure from loading to unloading. You owe it to yourself to know this unit better, so fill out the coupon and mail it today!
THERE'S A JAHN TRAILER FOR EVERY HAULING NEED
PRESSED STEEL CAR COMPANY, INC.
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Dear Sir:
Send me literature on the Jahn 410 Wide Platform or any others I have checked.
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ROSCO Model RHU
MAINTENANCE DISTRIBUTOR

General Purpose Unit for Handling All Types of Bituminous Materials

This efficient machine is designed for contractors, including those who want to get started in road work. Rosco Model RHU is also in demand by cities, towns, counties, state and federal authorities because it can maintain streets and make road repairs at low cost. This machine will do a variety of jobs with such features as loading . . . transferring . . . spraying . . . handspraying . . . circulating . . . reverse suction . . . clean-out . . . gravity draw-off. For mounting on trucks of 60" to 72" from back of cab to center rear axle. Built in 800 and 1000 U. S. gallon capacities.

Ask your Rosco dealer for complete specifications, or write the factory.

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Burners and all operating equipment mounted at rear. Stationary or shifting type spraybars available in three styles.

Dr. Rudolf K. Bernhard of the Joint Highway Research Project lab at Rutgers, adjusts frequency controls of an oscillator which drives the dynamic-compaction machines used to perfect the new road-compaction process.

Dynamic Compaction

A new road-compaction method has been perfected which produces a longer-lasting base at a considerably lower cost—a happy prospect for the state of New Jersey and its taxpayers. Recently announced by the Joint Highway Research Project at Rutgers State University, after five years of research and testing, the new process also helps alleviate New Jersey's pressing traffic problems by allowing more roads to be built, faster and cheaper.

The technique, achieved by combining vibrators with conventional rollers in compacting road-base materials, has been successfully applied to three recent road jobs in south Jersey with appreciable savings as the speed of the operations drastically reduced labor and equipment costs. State highway officials have given it full endorsement.

The basic principle of dynamic compaction is described by Dr. Rudolf K. Bernhard, professor of engineering mechanics and director of the project, in a report, "Dynamic Compaction of Soil," as the addition of a vibrating force on a dead weight or static force. The combination of static and dynamic loads compacts roads more effectively than static or dynamic compaction alone. Dynamic compaction is not new to engineering. It has been used to increase density in concrete and its soil-compacting potential has been and is being explored in other areas.

The new road-compaction process was devised by driving the compacting machine with an oscillator which consists of three eccentrically supported weights rotating around three parallel shafts. The rotational and impact characteristics of the compactor can be controlled when the machine in operation.

By using dynamic compaction in the proper frequency range, it is possible to compact a given area in a fraction of the time required under the old methods. With highly favorable conditions, this system has produced more than 95 per cent density down to 3 feet and deeper. Considering the comparatively thin soil layers to which rollers are restricted in compacting operations, the new process promises a substantial saving in time and money.

Two problems still requiring attention if dynamic compaction is to achieve maximum effectiveness are: the question of soil properties—which type of soil yields the best compaction results; and the weight of the hauling and dispersing equipment now used in road construction. In the latter case the machines may have to be modified to prevent them from breaking through the loose soil surface resulting from the greater depth of fill that can be utilized when the operation is employed.

However, even pending solution of these problems, the results dynamic action has produced greatly exceed those obtained by static methods.

Gar Wood Export Manager

E. W. Hazzard has been named Corporation Export Manager of Gar Wood Industries, Inc., Wayne, Mich. In this post he will direct the company's export operations and coordinate the international sales activities of all Gar Wood Divisions.

BIRMINGHAM STANDARD
Lowbed Trailer

$2,242. FOB Birmingham including lights and rear ramp, plus taxes.

Model 415 FL, 15-ton capacity. Tubular rear axle with Timken bearings. Open hearth steel frame, electrically welded. Select car stock oak decking 2¾" thick. Bendix Westinghouse airbrakes. Birmingham Trailers offer greater capacity, ease of handling, rugged wear. Furnished in standard models or special design.

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says F. D. Turner, Landscape Architect, Redwing, Minnesota

"On the recent Wayzata Boulevard job, one man with a RYAN POWER SOD CUTTER cut 4,000 square yards of sod a day. In all my experience I've never seen such perfect sod cut so fast . . . I consider the RYAN POWER SOD CUTTER an indispensable piece of equipment."

THE RYAN WAY . . .
IS THE PROFIT WAY

HERE'S WHY—

- One-man operation . . . Easy as mowing a lawn
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- Cuts perfectly over irregular terrain

For complete information write:

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L-E-VATION
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A
DIRECT READING
LEVEL ROD
—FOR—
TAKING ELEVATIONS
WITHOUT COMPUTATIONS
NO ADDITIONS
OR SUBTRACTIONS OF
BACK-SIGHTS OR
FORE-SIGHTS
EVERY ROD READING AN
ELEVATION
ONLY TWO COLUMNS
NEEDED IN THE
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STATION and ELEVATION
ACCURATE
SPEEDY
ECONOMICAL

Available at Your Dealer
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SUNBURY, PENNSYLVANIA

Too expensive to move your Steel Buildings from job to job?
...SPECIFY ARRO INSULATED PANEL
ARROWHEAD STEEL PANEL BUILDINGS

√ LARGER COMPONENTS—lower erection time, knock-down time, and re-erection time saves money for you. ArroPanels are over 10 times as large as ordinary building panels, yet can be handled with a minimum of labor. All bolted construction—no welding or cutting required in assembly.

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√ MORE ECONOMICAL—Larger panels mean lower square foot panel cost without sacrificing quality. ArroPanels are individually engineered and insulated to your specifications.

√ BETTER INSULATED—Hollow-wall construction with fully ventilated reflective and/or fiber-glass insulation eliminates condensation and provides comfortable, workable shelter in the most extreme cold or heat.

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Engineers • Manufacturers • Fabricators • Distributors
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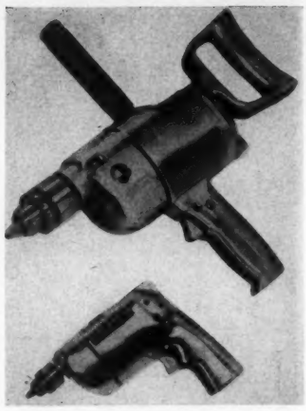
Electric Hand Drills

Two new electric hand-drill types, a general-duty with ¼-inch chuck and a ½-inch-capacity special-duty, are produced by the Porter-Cable Machine Co., 1714 N. Salina St., Syracuse, N. Y. Both models have spindle ball-bearing construction to absorb radial load and end thrust, Jacobs gear-type chucks for slip-proof gripping of bits, and powerful Universal motors. Housings are die-cast aluminum with air-cool vents located to avoid covering by hand.

The general-duty Model 107 with ¼-inch chuck is designed for intermittent use. It has a full-hand pistol grip with push-button lock. Compound reduction gears deliver maximum power to the spindle for drilling. The idle speed of 2,000 rpm may be used for drilling in wood, metal, and compositions. The tool is 8¼ inches long and 2¾ inches wide. It can drill within ¾ inch of a parallel surface, and weighs 3 pounds 6 ounces.

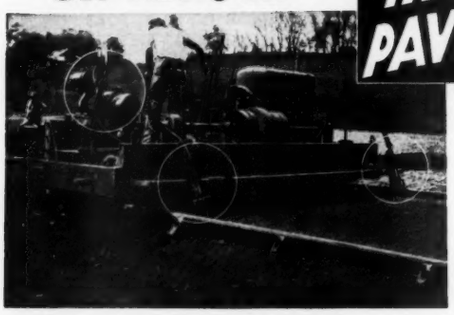
The special-duty Model 109 with ½-inch chuck is built for intermittent use for penetrating metals and other resistant materials, as well as wood. A spade handle at rear can be changed to vertical or horizontal position, or removed entirely. The lower full-hand grip has a trigger lock-bottom switch. A removable auxiliary handle enables the operator to increase pressure and control torque. Without the rear handle the tool is 10¾ inches long, 3¾ inches wide. It drills within 1¼ inch of a parallel surface and weighs 9 pounds. This model has double-compound reduction gears and idles at 450 rpm.



Further details may be secured from the company. Or use the Request Card at page 18. Circle No. 359.

Maginniss HI-LECTRIC CONCRETE VIBRATORS ON THE JOB—

VIBRATING HIGHWAY PAVEMENTS



NO FLEXIBLE SHAFTS

ELECTRIC MOTOR IN HEAD

REMOTELY CONTROLLED BY OPERATOR

With a Maginniss HI-LECTRIC Vibrator, concrete placing in any type of form is faster, cheaper, effortless, with a better looking job when the forms are removed.

The HI-LECTRIC Vibrator is strictly one-man operated. The on-off switch is at his hand, while the power unit operates unattended up to 200 feet away.

Maginniss POWER TOOL CO.
MANSFIELD, OHIO

COMPLETELY PROVEN! 4 WHEEL DRIVE WITH 2-SPEED RANGE FOR CHEVROLET and GMC TRUCKS

at a new low cost!

ONLY $1485 F.O.B. MINNEAPOLIS

NO OTHER 4 WHEEL DRIVE COMPARES WITH NAPCO'S Powr-Pak . . . absolutely the FINEST for PERFORMANCE, DURABILITY and COST!

The NAPCO 4 Wheel Drive is *by far* the *lowest priced* in the field. What's more, you get a better, more powerful unit that is *outstanding* for rugged construction and *unexcelled* for lasting performance. It is the same military-type 4 wheel drive chosen by the U. S. Armed Forces during World War II on the hundreds of thousands of Chevrolet and GMC trucks used throughout the world.

Installation is simple, can easily be completed in one day! All front axle differential parts are the same as the standard rear axle.

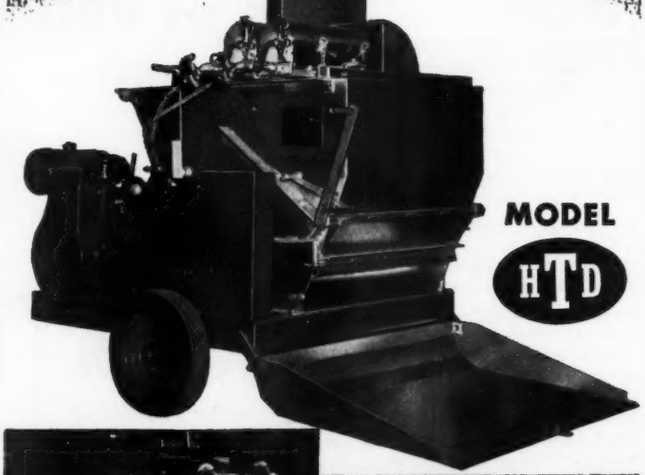
- OVER ROUGH TERRAIN Extra dependable traction with NAPCO 4 WHEEL DRIVE takes your truck through almost impossible areas in less time, and with minimum maneuvering.
- FOR TOUGH UPHILL GOING No ordinary 4 wheel drive can match the NAPCO Powr-Pak on gradeability—in low-low, your truck will climb grades up to 70 per cent!
- MASTERS MUD AND SAND NAPCO 4 WHEEL DRIVE assures plenty of traction to enable your truck to go through mud and sand easily where other trucks stop dead in their tracks.
- OVER ICE AND SNOW Sure footing, greater safety and plenty of push on the slickest roads are wrapped into one unbeatable package—the NAPCO 4 WHEEL DRIVE!

Write today for free, illustrated folder giving complete details and specifications on this completely proven NAPCO 4 WHEEL DRIVE

NORTHWESTERN NAPCO CO.

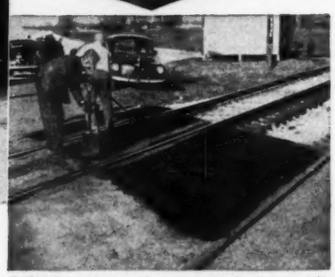
Here's *Exactly* What You Need For All-Weather Pavement Patching and Small Jobs—

IN FALL, WINTER, SPRING OR SUMMER



MODEL HTD

Patches may be made and opened to traffic immediately. No cover aggregate is required. Economy!



Railroad crossing repair or construction is especially well suited to HTD Mixer; also small jobs.

THE "MULTI-PUG" ASPHALT MIXER

Prepares Hot, Cold or Heated Mixtures on the Job —*For Immediate Use!*

Just hitch a McConnaughay HTD Mixer to your truck and you'll be all set to make quick, economical pavement repairs in any season, under wet or dry conditions; also fully equipped to handle any small surfacing jobs. For the HTD (rigidly tested by many users) will handle on-the-job mixtures of asphaltic concrete, sheet asphalt, sand asphalt or mastic asphalt... hot, intermediate or cold... at the rate of 1 to 3 minutes per batch, enabling you to meet all conditions with least effort, at lowest possible cost. With 3 cubic feet capacity, powered by a 6 h. p. air-cooled engine and equipped with 2 vaporizing coil burners and fuel pump, the HTD can do a remarkable job for you the year 'round. Engineering service and construction advice furnished. Write today for details and specifications.

K. E. McCONNAUGHAY
LAFAYETTE 3, INDIANA

Convention Calendar

January 13-16—Highway Research Board
Annual Meeting, Highway Research Board, National Academy of Sciences, Washington, D. C. Fred Burggraf, Director, 2101 Constitution Ave., Washington 25, D. C.

January 26-27—Landscape Architects
Fifty-fourth Annual Meeting, American Society of Landscape Architects, Atlanta Biltmore Hotel, Atlanta, Ga. Bradford Williams, Corresponding Secretary, 9 Park St., Boston 8, Mass.

January 26-28—Asphalt Technologists
Annual Convention, Association of Asphalt Paving Technologists, Rice Hotel, Houston, Texas. Ward K. Parr, Secretary-Treasurer, Box 376, Ann Arbor, Mich.

January 26-28—Georgia Conference
Georgia Highway Conference, Georgia Institute of Technology. Atlanta, Ga. C. H. Taylor, Coordinator, Georgia Institute of Technology, Atlanta, Ga.

January 26-29—Heating and Ventilating
Fifty-ninth Annual Meeting, American Society of Heating and Ventilating Engineers, Conrad Hilton Hotel, Chicago, Ill. A. V. Hutchinson, Executive Secretary, 62 Worth St., New York, N. Y.

February 1-5—AED Convention
Thirty-fourth Annual Convention, Associated Equipment Distributors, Conrad Hilton Hotel, Chicago, Ill. P. D. Hermann, Executive Secretary, 30 E. Cedar St., Chicago 11, Ill.

February 2-4—Concrete Short Course
Quality Concrete Short Course, Georgia Institute of Technology, Atlanta, Ga. C. H. Taylor, Coordinator, Georgia Institute of Technology, Atlanta, Ga.

February 9-11—ARBA Meeting
Annual Convention, American Road Builders' Association, Statler Hotel, Boston, Mass. Lt. Gen. Eugene Reybold, Executive Vice President, International Bldg., Washington 4, D. C.

February 17-19—Concrete Convention
Annual Convention, American Concrete Institute, Statler Hotel, Boston, Mass. William A. Maples, Acting Secretary-Treasurer, 18263 W. McNichols Road, Detroit 19, Mich.

February 23-26—National Sand & Gravel and National Ready Mixed Concrete
Annual Conventions, National Sand & Gravel and National Ready Mixed Concrete Associations, Fairmont Hotel, San Francisco, Calif. V. P. Ahearn, Executive Secretary, 1325 E St., N.W., Washington 4, D. C.

February 24-26—Illinois Conference
Thirty-ninth Illinois Annual Conference on Highway Engineering, University of Illinois, Urbana, Ill. Wm. S. Pollard, Jr., Department of Civil Engineering, University of Illinois, Urbana, Ill.

February 25-28—Concrete Pipe Meetings
Fourth Annual Convention, American Concrete Pressure Pipe Association and Forty-fifth Annual Convention, American Concrete Pipe Association, Baker Hotel, Dallas, Texas. Howard F. Peckworth, Managing Director, 228 N. LaSalle St., Chicago, Ill.

March 2-6—ASCE Meeting
Spring Meeting, American Society of Civil Engineers, Fairmont Hotel, San Francisco, Calif. Don P. Reynolds, Assistant to the Secretary, 33 W. 39th St., New York, N. Y.

March 2-6—ASTM Meeting
Spring Meeting and Committee Week, American Society for Testing Materials, Hotel Statler, Detroit, Mich. Robert J. Painter, Executive Secretary, 1916 Race St., Philadelphia 3, Pa.

March 4-6—AHONAS Convention
Annual Convention, Association of Highway Officials of the North Atlantic States, Hotel Traymore, Atlantic City, N. J. A. Lee Grover, Secretary-Treasurer, 1035 Parkway Ave., Trenton, N. J.

March 5-7—Mississippi Valley Conference
Annual Mississippi Valley Conference of State Highway Department, Edgewater Beach Hotel, Chicago, Ill. H. L. Aitken, Secretary, Nebraska Department of Roads and Irrigation, Lincoln, Nebr.

March 16-20—NACE Conference
Ninth Annual Conference, National Association of Corrosion Engineers, Hotel Sherman, Chicago, Ill. A. B. Campbell, Executive Secretary, 1061 M & M Bldg., Houston 2, Texas.

March 18-20—New York Highway Engineers
Annual Convention, New York State Association of Highway Engineers, Hotel Statler, Buffalo, N. Y. William Gallancy, Convention Chairman, State Department of Public Works, 65 Court St., Buffalo 2, N. Y.

March 23-27—AGC Convention
Thirty-fourth Annual Convention, Associated General Contractors, Miami Auditorium, Miami, Fla. Charlson I. Mehl, Administrative Aide, Munsey Bldg., Washington 4, D. C.

March 24-27—New York Safety Council
Twenty-third Annual Safety Convention and Exposition, Greater New York Safety Council, Hotels Statler and New Yorker, New York, N. Y. Paul F. Stricker, Executive Vice President, 60 E. 42nd St., New York 17, N. Y.

April 6-9—Purdue Road School
Purdue Road School, Memorial Union Bldg., Purdue University, W. Lafayette, Ind. Prof. Ben H. Petty, Civil Engineering Bldg., Purdue University, Lafayette, Ind.

April 10-11—Michigan Engineering Meeting
Annual Meeting, Michigan Engineering Society, Kellogg Center Hotel, Michigan State College, E. Lansing, Mich. Joseph E. Wilbur, Executive Secretary, P. O. Box 573, Kalamazoo, Mich.

April 13-15—Lubrication Engineers
Annual Meeting and Lubrication Exhibit, American Society of Lubrication Engineers, Hotel Statler, Boston, Mass. William P. Youngclaus, Jr., Administrative Secretary, 343 S. Dearborn, Chicago 4, Ill.

April 13-15—South Dakota Short Course
South Dakota Highway Short Course, Student Union Bldg., Brookings, S. Dak. Prof. Emory E. Johnson, Civil Engineering Department, State College Station, S. Dak.

April 28-30—Wood Preservers' Convention
Annual Convention, American Wood Preservers' Association, Cleveland Hotel, Cleveland, Ohio. Harry J. Schulte, Hotel Committee Chairman, 20106 Kinsman Road, Cleveland 22, Ohio.

Ingwersen of Armco Dies

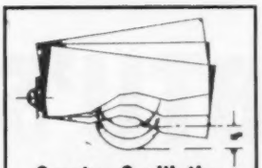
John A. Ingwersen, Vice President in Charge of Distribution for Armco Steel Corp., Middletown, Ohio, died last month. He had been with the company since 1923.

Trailer-Mounted Floodlight Unit
NITE-HAWK
MAKE NIGHT HOURS PAY with this flexible light and power unit. Four corner-mounted, 80,000 C.P. flood lights raise to 8½ Ft. and aim in all directions. Control panel has duplex receptacles for lines to extension lights and power tools — voltage regulator — circuit breaker — fused circuits — many other features. Tows at highway speeds on heavy-duty trailer with leaf springs and retractable caster wheel. This is the finest, most adaptable unit on the market. Dependable, low cost 300 to 10,000 watt gas electric plants also available.
WRITE FOR LITERATURE AND PRICES.
Powered by Wisconsin 4 cylinder air-cooled engine.

WINPOWER MFG. CO.
TEL. 236 NEWTON, IOWA

compact heavier lifts
with fewer passes

Southwest COMPACTION ROLLER


Greater Oscillation
Each wheel of the Southwest Compaction Roller is mounted in an independent weight-box unit. Hinge point of wheel is at extreme rear of its own weight-box. Closely spaced wheels give maximum compaction with as much as 12" variance in height. Offers oscillating freedom and greater compaction on uneven ground

ON THE BIG JOBS use the Southwest Compaction Roller to keep pace with speedy, 24-hour job schedules and bigger earthmoving equipment. It compacts heavier lifts with fewer passes. Weight-box units oscillate up and down independently to provide a constant compaction weight on each tire regardless of ground contours. There is no bridging, no shifting of load.
The Southwest Roller has flexibility to suit varying job requirements. Weight-boxes may be filled with wet or dry sand, earth, scrap or other materials. Sectionalized hauling yoke permits use of any combination from 3 to 6 weight-box units. Sizes and capacities range from 10 to 200 tons, suitable for light, medium or heavy duty compacting of earth.

Type Soil	Symbol	No. of Single Passes	% Moist	FIELD Dry Density Lbs./Ft. 3 Passing #4 Actual	FIELD Dry Density Lbs./Ft. 3 Passing #4 Corrected	OPTIMUM % Moist Pass #4 Sieve	OPTIMUM Dry Density Lbs./Ft. 3 Pass #4	OPTIMUM Ratio Den.—Opt —Pass #4
Silty Sand	SM	6	7.3	128.0		8.0	133.6	96.0
Sandy Clay	CL	6	10.2	110.0		15.3	116.2	95.5
Sandy Clay	CL	6	14.3	114.0		15.3	116.2	98.0
Sandy Silt	ML	6	14.6	115.0		14.2	120.8	92.0
Clayey Sand	SC	6	9.2	125.2		10.2	128.3	97.8
Silt	ML	6	6.6	119.0		9.5	125.0	95.0
D.G	SW	6	8.7	126.7		9.2	132.0	96.0
D.G	SW	6	5.2	129.0		7.8	135.0	96.0
Straight Clay	CL	6	6.3	122.8		10.3	127.1	96.6
Pit Run	GW	6	4.8	133.5	126.5	7.7	134.5	95.0

The above data on unit weight of soil samples has been taken from average compacted fills placed in lifts from six to twelve inches as specified The unit weight per pneumatic wheel load being 25,000 lbs

WRITE TODAY for illustrated folder which gives complete data and specifications.

CONSTRUCTION MACHINERY DIVISION
Southwest Welding & Manufacturing Co.
Alhambra, California
HAULING SCOOPS BULLDOZERS LOADERS BOTTOM DUMP WAGONS RIPPERS TAMPERS SCRAPERS TREE DOZERS

Diesel-Tractor Literature

A 4-page booklet on its diesel-powered tractors is available from R. H. Sheppard Co., Inc., Hanover, Pa. The versatility and maneuverability of the wheel-type tractors are illustrated by the Model SDI-3 working with a Lull Shoveloader, Hopto Digger, and special purpose units.

This literature may be obtained from Sheppard, or by using the Request Card at page 18. Circle No. 257.

HRB: Granular Subbases And Pumping of Pavements

A new bulletin, "Performance of Concrete Pavement on Granular Subbase", has been issued by the Highway Research Board. It includes two papers sponsored by the Committee on Maintenance of Concrete Pavement as Related to the Pumping Action of Slabs and presented at the annual meeting of the board last year.

Bulletin No. 52—"Effectiveness of Granular Bases for Preventing Pumping of Rigid Pavements"—was written by Carl E. Vogelgesang of the Indiana State Highway Commission. The study covers a condition survey of 328 miles of rigid pavement constructed with granular bases. In the report, six types of distress or defects are defined and described, as well as classified by projects. The data and analyses show that granular bases have been effective in preventing pumping of rigid pavements.

The fact that granular subbases have been effective in the control of pumping, is pointed out by W. E. Chastain and John E. Burke of the Illinois Division of Highways in their study, "Performance of Concrete Pavements on Granular Subbase". This report contains the results of a detailed examination of the performance of 86 miles of heavy-duty concrete pavement on granular subbase. Included in the survey are both trenched subbases without drains and subbases extended through the shoulders.

The bulletin, illustrated with pictures, maps, and tables, is available from the Highway Research Board, 2101 Constitution Ave., Washington 25, D. C., for 60 cents.

Fastener Assembly

Fasteners for joining conveyor and elevator belts are now offered with assembled bottom plates in boxes of 100 sets which include the top plates and nuts as well. The assembly includes the bottom plates, the bolts, and the retaining clips which hold the bolts in place. The top plates and nuts are kept separate in the box. Flexco fasteners are available made of stainless steel, Monel, Everdur, and Promal.

Further information may be secured from Flexible Steel Lacing Co., 4607 Lexington St., Chicago 44, Ill. Or use the Request Card at page 18. Circle No. 357.

LeBus All-Purpose SNATCH BLOCKS No Other Can Compare

Undoubtedly the World's most durable Snatch Block, the LeBus Block may be readily adapted for all purposes through its complete interchangeability of parts. It is completely drop forged of alloy and high carbon steel and is thoroughly heat treated for strength and durability. LeBus Snatch Blocks are given the full strength test before leaving the plant and are fully guaranteed.

- EASILY ASSEMBLED OR DISASSEMBLED
- No Tools Needed
- No Accidental Opening
- Easy Line Insertion
- No Sparking Danger
- Used with wire line or Manila Rope
- Bearing Oil & Dust Seal

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EASILY OPENED • NO BOLTS OR NUTS TO BURR, FOUL OR LOSE •

LEBUS

BUY FROM YOUR SUPPLY STORE

LEBUS ROTARY TOOL WORKS

P.O. BOX 2352 LONGVIEW, TEXAS L.D. Phone 5

you can't CONSOLIDATE THIS CHEAPLY unless you can CONSOLIDATE THIS FAST!

VIBRO-PLUS ROLLGEAR* internal vibrator

No other vibrator consolidates concrete as fast as Vibro-Plus because only Vibro-Plus has the patented Rollgear head — stepping up shaft speed to 11,000 to 15,000 VPM. This exclusive design eliminates gears, belts and clutches — minimizes wear, reduces down-time, cuts operating costs. That's why only Vibro-Plus is so fully satisfactory in performance. Write for illustrated bulletin and name of nearest distributor.

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Instant SAFE, precision controlled heat, thru efficient asbestos-lined duct to the exact spot needed. Wintertime construction, thawing, drying, aircraft warm-up, crop drying—hundreds of uses. When writing for further information also ask about The Little Chinook Wind, price $95.50.

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Duct: 12 foot lengths, easily coupled without using tools. Single and double duct adaptors with deluxe CHINOOK WIND.

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Eight-Mile Stretch Of Difficult Grading

Dangerous Highway Is Rebuilt to Modern Grade and Width As Road Contractor's Crew Whips Weather and Traffic

• IMAGINE, in one highway cut, all these materials: solid granite, boulders cemented in caliche, obsidian sand, decomposed granite, clay, sandy dirt, and gravel.

Impossible? Hardly, said Strong Co., contractor of Springville, Utah, after finishing the 100,000-cubic-yard excavation of all these composite materials 6 miles south of Beaver, Utah, where it rushed to completion last fall a $508,000 highway contract for the Utah State Road Commission. While the big cut was one of the unusual features of the project, it was no worse than traffic, weather, or formations in the remainder of the 8-mile improvement section.

Strategically Dangerous

The geographical location of this section of U. S. 91 puts it in a strategically dangerous location. During the hot summer months, people driving from California have a habit of traveling across the 300-mile desert between Victorville, Calif., and Littlefield, Ariz., at night. At daybreak the next morning, tired and sleepy from the all-night vigil, these motorists find the rising sun full in their faces at approximately the place where Strong's work was located. Since the old highway was narrow and its alignment was bad, two or three major wrecks a week were the result. Traffic studies made by the Traffic Division of the Utah Highway Department uncovered this condition, and the improvement work was an answer.

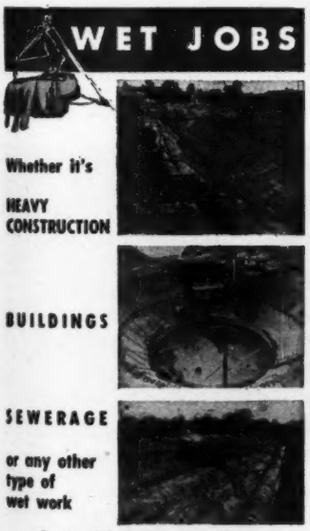
The old road was a winding 20-foot road-mixed bituminous mat, which had been strengthened by maintenance crews and beaten up again by traffic. But the new highway is among the most modern of Utah's designs, approximating a similar section put in several years ago at Scipio Hill, 40 miles north.

(*Continued on next page*)

Powered by a 350-cfm Ingersoll-Rand compressor in the background, this I-R wagon drill sinks powder holes in a rocky location where the new highway was built.

Ray Day Photo

WET JOBS



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This sturdy, hydraulic unit, mounted on a rubber-tired tractor, moves in and out of tight spots easily, gets digging done in a fraction of the time and cost of manual labor. The Sherman Power Digger bites away the earth with over 10,000 pounds pressure at shovel teeth. Yet, this machine moves over the roads at speeds up to 25 mph to take on jobs impractical and inaccessible to larger equipment.

Reduce operating and maintenance costs on all your smaller excavating jobs. Write today for free descriptive Bulletin O41.

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Eight-Mile Stretch Of Difficult Grading

(Continued from preceding page)

Design for the improved highway called for easy grades, long curves, and good sight distances. Subgrades, both in fills and cuts, were compacted to a 90 to 95-density range, referred to the Modified AASHO test. The finished grade is slightly more than wide enough to carry 40 feet of pavement. The roadway surface consists of two 12-foot traffic lanes, with 8-foot paved shoulders on both sides. This material is 3-inch plant-mixed asphaltic concrete, made with 120 to 150-penetration asphaltic cement. An RC-4 and chip combination on the traffic lanes gives desirable color separation between the roadway and shoulders.

For many years Utah has been a state which has had to deliver all-weather highway surfaces without too much regard for the bases beneath them, primarily because highway money has never been too plentiful. But Utah's engineers are reversing that trend, and a good base course of granular material was placed between the compacted subgrade and the asphaltic-concrete pavement.

From Station 245+00 to 405+00, and from Station 438+00 to 493+00 this 2-inch-minus granular material is 4 inches thick; from 405+00 to 438+00 and from 493+00 to 665+00 the base course is 8 inches thick. A special surface blanket of 1-inch crushed rock was laid 3 inches thick throughout the project, over both 4 and 8-inch subbase thicknesses.

The project was also designed for reduced maintenance. Side slopes in cuts are 3 to 1 under 10 feet; 2 to 1 over 10 feet; and 1½ to 1 in rock. Fill slopes are 4 to 1 under 10 feet and 2 to 1 over 10 feet. The improved grades, better alignment, and flatter slopes are expected to ease a particularly bad snow problem at this point. From October through May this 6,000-foot-high area is vulnerable to sudden, severe snowstorms.

A Marion truck crane is placing a conveyor belt in position as crews hurry to make Strong's rock plant operative in its second location in the Beaver project. This plant produced 350 tons an hour. *Ray Day Photo*

Traffic Detoured

One of the first items of work when Strong moved in on August 11, 1951, was the construction of road-mixed bituminous detours to handle traffic around those sections on the old alignment. Some 4½ miles of such detours had to be constructed for the 8-mile job. In two places there was a 15-foot elevation differential between old and new grades. It called for sizable grading and compaction spreads to make the detours meet the main highway at these points. In spite of all the warning signs which had been posted, traffic normally moved through the job at something like 60-mph. Transitions had to be built to handle such driving.

Grading: Unclassified but Tough

The 343,000-yard excavation job was bid unclassified, but it turned out to be anything but easy. About

NEW IMPROVED! CANCAP automatically protects tractor exhaust systems from damaging rain, sleet and snow . . .

New Wider Opening Action Allows Unrestricted Exhaust Gas Escape.

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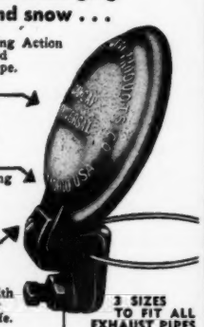

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There is a CP DEMOLITION TOOL for every type of work, ranging from the lightweight CP-111 (25 lb. class), for lateral or overhead jobs, to the heavy-hitting, smooth handling CP-117 (80 lb. class), for which no job is too tough.

The only "one-man gun" of its kind — cutting *one-inch* rivets — CP-11X BOYER RIVET BUSTER has quick-change retainer for chisels and backing-out punches. Powerful 11" stroke. With chisel, it is 31" long and weighs 35 lbs.

Heavy-duty CP-365 AIR IMPACT WRENCH saves time in removing nuts or bolting-up structural members — takes the hard work out of equipment maintenance. Capacity to 1¼" bolt size.

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ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

40,000 cubic yards were solid rock which had to be drilled and shot. The balance was moved—some not too easily—by rippers and tractor equipment. The job was set up on a balanced basis with very little borrow. The big 100,000-yard cut was located in the center of the project, and the remaining cuts and fills were fairly well spaced.

Strong used a "figure 8" method of digging and hauling the material, with grading equipment loading at the crossover point of the "8". Hauling first one direction and then the other from the cut, the method eliminated two turns in the digging cycle and boosted yardage.

On the longest hauls, some of which were 3,500 feet one way, Strong used three LeTourneau Model C Roadster electrically controlled Tournapulls. For hauls of intermediate length, up to 1,500 feet average, three Super C Tournapulls were used. For short-haul work of 500 feet, a Wooldridge, LeTourneau, and a Caterpillar No. 80 scraper moved the material. Seven Caterpillar D8's were in the spread, with three assigned to scrapers and the remainder serving as dozer or snatch cats. Two Model C Tournadozers were used as pusher tractors; one powered by a General Motors diesel, the other by a Buda.

Auxiliary equipment for dirt processing included three 4,000-gallon Mack-mounted, air-controlled water tankers, which often hauled up to 11 miles. Two sheepsfoot-roller units were pulled by Case tractors part of the time on level fills, and by Caterpillar D8's if the fill was particularly difficult getting started. There were also three Caterpillar No. 12 motor graders. One of these machines stayed with the grading spread, either as a leveler of fill dirt or as a bank sloper.

The graded material, moved by the tractor-equipment spread, was a motley assortment of practically everything which lies at the top of Utah's lofty mountainous country. Large round granite boulders cased in caliche were common, and there was obsidian sand, sandy stiff clay, decomposed granite, and hard caliche. Most of these materials responded to the single-tooth K30 LeTourneau Rooter which was often used ahead of the grading machines.

In spite of flashy storms throughout the winter, the material needed so much water that the water trucks often worked 24 hours round the clock to keep up with the operation. The material was laid down in lifts as nearly 8 inches thick as possible, though the presence of many big rocks and boulders obviously made that a very difficult job. The long-haul electric Tournapulls worked 6 days a week on a single 8-hour shift basis. The remainder of the

A Model C Tournadozer gives this Tournapull an assist as it picks up a load of material. *Ray Day Photo*

grading spread worked two 8-hour shifts, 6 days a week.

In those areas where solid rock had to be gouged out to make room for the new highway, a small drilling and powder crew moved along ahead of the grading equipment. One Ingersoll-Rand 350-cfm compressor and an Ingersoll-Rand wagon drill, along with an Ingersoll-Rand 55-pound Jackhamer, drilled the necessary powder holes. Timken standard rock bits and tungsten carbide bits were used.

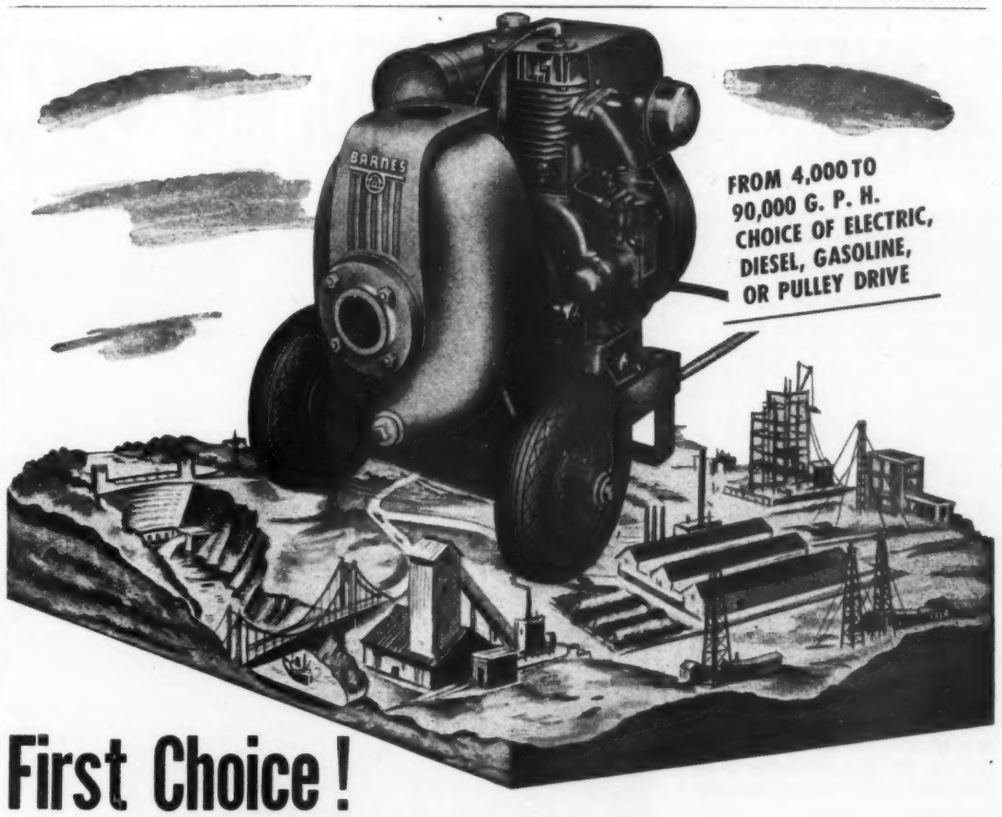
Most of the powder work was either in shallow cuts or pockets, where 8-foot steel was long enough. On this shallow work, the holes were spaced about 7 feet apart and were barrel-loaded with 60 per cent Illinois Powder Co. gelatin. Most shots were made with instantaneous detonators, but on some of the tricky slope work, zero, No. 1, and No. 4 delays were also used. One heavy rock pocket, in granite, required 22-foot steel and some fairly heavy shooting.

Crushing Plant Used

The granular-base and plant-mix-filler requirements were sufficient to cause Strong to assign its best rock crushing and screening plant to the Beaver job, for tonnages included 143,500 of gravel subbase and crushed rock, and 35,000 tons of plant-mix.

The rock plant which Strong used was designed and shop-assembled

(Concluded on next page)



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Barnes Centrifugals are really built! The heavy duty body and impeller defy wear! The Barnes Life-time Super Seal, with its case-hardened bearing surfaces assures trouble-free service for job after job — year after year!

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Barnes
MANUFACTURING CO
MANSFIELD, OHIO

Eight-Mile Stretch Of Difficult Grading

(Continued from preceding page)

under Ernest A. Strong's supervision several years ago. It was his hope to pick equipment with tested and proved ability to turn out high tonnage at sustained speed. The result was a plant which quite often turned out 350 tons an hour of 2-inch-minus base material in a pit where about 45 per cent of the material had to be reduced by crushing.

The plant components are best illustrated by following a load of raw material through. Pit-run material was usually fed to the plant by a dozer, which shoved the material to a Pioneer feeder, set in a 7½-foot Multi-Plate steel culvert pipe. Powered by a 20-hp electric motor, this reciprocating feeder sent the material on to the conveyor belt which elevated it to the top of the plant.

The first sizing was done as pit-run material reached a Pioneer 4 x 12 vibrating-screen deck, powered by a 15-hp electric motor. All material meeting size requirements dropped through this screen and was immediately taken away by conveyor to the storage bin. No material which met size requirements was held in the system at any time.

Oversize material on the Pioneer shaker screen passed to a 20 x 36 Universal jaw crusher, powered directly by an International UD-18 diesel. Throughs from this jaw were then sent to a 40 x 24 Universal roll crusher, powered by a Caterpillar D13000 diesel. All of this material then passed to a 3 x 8 Simplicity shaker screen, which dropped acceptable material through for storage in the surge bin. This screen was operated in a closed circuit with the first Pioneer screen, so that the remaining oversize rock could return through the crushers until it was reduced to size.

Electrical energy was generated by a 50-kw unit, powered by an International UD-18 engine. All conveyors and shaker screens were powered by individual electric motors. The plant has been remarkably trouble-free in its 3-year life, and has proved itself to be a dependable piece of construction equipment.

Crushed and sized material was hauled away from the plant by a fleet of eight 16-ton Mack trucks, which delivered it to the highway and spread it according to the required tonnage per station. Crushed base course was then blade-mixed, watered if necessary, cut out, laid down, and rolled by Buffalo-Springfield rollers.

Although Strong Co. had its own hot plant for mixing the asphaltic concrete, the work load for 1952 was so great that H. T. Reynolds of Springville subcontracted the inside track of the Beaver job.

Equipment Maintenance

The maintenance and repair of all equipment on this project was tied in with the over-all policy of the company. It is a sufficiently good policy to merit some treatment, for company officials are trying to increase the effective service hours of their equipment beyond what is considered normal, through a program of preventive maintenance.

A 60 x 150-foot concrete and brick shop has been built in Springville to be a focal point for that service, regardless of whether Strong is working in Utah, Idaho, or Wyoming. All major repairs are made in this central headquarters shop in winter, during the offseason for construction. The company is fairly well standardized on equipment, so that spare engines for the main pieces of equipment can be maintained in a ready-to-go condition at Springville. Sizable stocks of spare parts are stored at the central shop also, and parts trailers on every field job are also well stocked with the small parts and items which are more than usually expendable. Field maintenance and service by mobile service units rounded out the program, so that equipment, like tractors, could work on a rocky job for 4,000 hours before an overhaul was necessary.

The Springville headquarters shop is so well built that the key men who work there during the winter look forward to the experience. The concrete floor has radiant heat, and if one of the big doors has to be opened on a bitter-cold day to let a piece of equipment in, the shop is warm again in a few minutes. A P&H 5-ton electric crane can reach all parts of the shop to within 3 feet of the walls. In addition to the usual run of heavy-duty mechanic's tools, the visitor can observe such equipment as a big Prentice drill press, a Wells band saw, a Black & Decker heavy-duty grinder, riveting machines for brake lining, and an 18-inch lathe.

Heavy-duty oil filters now permit engines to run as high as 200 hours before the oil is drained. Strong Co.

"BERG" Concrete Surfacer

R2-AS Model

A light-weight, portable, electric motor-driven Concrete Surfacer consisting of the Model R2 Right Angle Head and Model AS Motor Unit.

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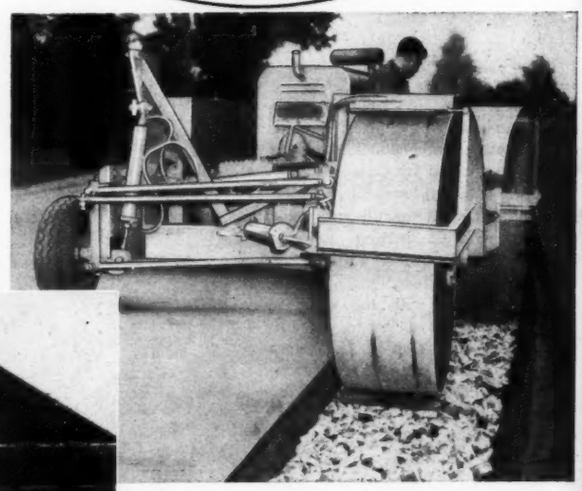
The Apsco Road Widener (below) has many firm friends in the contractor fraternity. Demonstrated savings, better than average results — are two of the important reasons.

And now the Dual Compression Trench Roller which greatly increases opportunities for economy in road widening. Together they make a winning team that puts you ahead — in both miles and money.



CONTRACTORS AND ENGINEERS Staff Photo

Unique design of this Dual Compression Trench Roller permits rolling 20" to 39" at one pass, or, by putting rolls "in-line", gives, in effect, two rollers in one. Think of the savings — in time and money!

This APSCO Widener helps speed the building of New Jersey turnpike at the rate of 150 to 200 tons of aggregate per hour. Note that no forms are required! Same is true when this machine lays concrete.

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See the APSCO distributor nearest you or write the factory — now!

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uses Quaker State oil exclusively, and changes oil-filter elements in accordance with the manufacturer's recommendations. Many users of internal-combustion engines are stretching the life of lubricating oil in this manner with no apparent harm to the engines.

Personnel

The new highway improvement, which has made a dangerous piece of highway much safer even for motorists foolish enough to drive all night, was finished and in service this fall. It was designed and supervised under the general direction of the Utah Department of Engineering, of which D. H. Whittenburg is Chairman, E. G. Johnson is Chief Engineer, and Sheridan Fiack is Construction Engineer. Wm. Davis is District Engineer, and Ben Lee is Resident Engineer in the field.

Contractor's operations were handled in the field under the supervision of General Superintendent J. Grant Richins. Carl Peterson was Crusher Superintendent and William Schreiner, Mechanical Superintendent. Excavation Foremen included J. M. Crammer, George Courdingly, and Lee Gillman. Labor-crew work was under the supervision of Foreman Ray Robison.

HRB Publishes Two Reports

The Highway Research Board has published its final report on Road Test One-MD—the effect of controlled truck-axle loadings on concrete pavement. (See C. & E., July, 1952, pg. 8.) The book is a detailed statistical report with illustrations, diagrams, and tables. It includes: a general summary of the project; traffic-test procedures and results; an analysis of soil data; and an analysis of the structural effect of heavy-vehicle loads.

For six months in 1950, the 1.1-mile portland-cement-concrete road near La Plata, Md., was subjected to round-the-clock traffic of single-rear and tandem-rear-axle trucks. Soil and strain tests were made the following year. The total cost of the project was $245,000. In general it was found that the effect of a 32,000-pound tandem-axle truck-load was about six times as destructive to pavement as those of an 18,000-pound single-axle load, and a 44,800-pound tandem load was about 50 times as destructive as the 18,000-pound load. For a copy of "Special Report 4—Road Test One-MD", write to Highway Research Board, 2101 Constitution Ave., Washington 25, D. C. The book is priced at $2.25 a copy.

Another new HRB publication, priced at 75 cents and obtainable from the same address, is "Special Report 6—Highway Relationships in Maryland." The book, a pilot study, presents the analysis and findings of a study of intergovernmental relationships in highway affairs in Maryland, covering both legal authority and administrative practice. The Board conducted this project with the cooperation of several organizations. Its objective was two fold: to formulate a comprehensive system of intergovernmental relationships in highway affairs; and to ascertain and test tentative principles in the light of local conditions and circumstances in a specific state.

This study of a typical state is a step in the direction of the ultimate goal of every state—the development of an over-all highway network which will provide efficient, safe, and economical highway transport service. Responsibility for this is shared jointly by each governmental unit having jurisdiction over roads or streets.

Corrosion-Inhibitor Data

Two illustrated bulletins on volatile corrosion inhibitors for protecting ferrous metals and aluminum from rust and corrosion without using oil or grease, are offered by the Berlin & Jones Co., Inc., 601 W. 26th St., New York 1, N. Y.

This literature may be obtained from the company, or by using the Request Card at page 18. Circle No. 261.

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Test course for new drivers has Safety-Beam protection

WHAT CANDIDATE FACES—New driving course can be completed in 4½ wheel-twisting minutes. With a state trooper at his side, the driver must negotiate an upgrade figure 8 (above) in either second or high gear, make a complete turn in one of the narrow "stalls" (above) without touching the curb or the guard rail, stop and hold the car at an upgrade stop sign (lower left), and make sharp turns (left) unexpectedly banked the wrong way. It's a workout for the troopers, too; up to 400 tests some days.

Bethlehem Safety-Beam Guard Rail—1375 feet of sturdy steel—guides rookie drivers through a new test course at the Pennsylvania State Police barracks near Bethlehem.

The same features that led to the choice of Safety-Beam here have caused highway engineers to specify it for danger spots along many miles of highway. Safety-Beam sections lock together in a continuous beam. Impact is absorbed, not by a single post, but by a number of adjacent posts. One bolt fastens Safety-Beam to any type of post, and unskilled workmen can do the job without special tools.

For complete information about Bethlehem Safety-Beam Guard Rail—and other road steel products listed below—call the nearest Bethlehem sales office, or write to us at Bethlehem, Pa.

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On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

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Sheet- and H-Piling • Fabricated Structural Steel

BETHLEHEM STEEL

Arc-Welding Prize Winners

Awards for the best designs of machinery and structures stressing the value of arc-welded construction have been announced by The James F. Lincoln Arc Welding Foundation of Cleveland, Ohio. As a result of the fifth annual Engineering Undergraduate Award and Scholarship Design Program, the engineering undergraduates in 23 different schools have been given national engineering recognition and awards totaling $5,000. In addition, scholarship funds of $1,750 have been awarded to three schools in honor of the first three award winners. The competition is sponsored by the Foundation to encourage students to study the possibilities of arc welding as an engineering tool for improving the quality of machinery and structures of all kinds while reducing costs.

Merle Geoffrion, an undergraduate in the Civil Engineering Department of the University of Delaware, received the $564 Second Award for his design of a continuous plate girder highway bridge, and the Department received in his honor a scholarship fund of $500. The Third Award of $282 went to Robert Murray for his analysis to determine the economic span lengths of rolled sections, plate girders, and trusses. He is a student in the Department of Architecture of Rensselaer Polytechnic Institute, and his school was awarded $250.

The rules for the sixth annual competition, which closes on June 29, 1953, have been simplified to avoid conflict with regular school work and the restriction of time. They may be obtained from the Foundation, Cleveland 17, Ohio. All registered undergraduates are eligible to compete.

The Foundation has also named the winners in its 1952 bridge-design competition, "Welded Bridges for Steel Conservation". The entries in this program—to encourage the creation of bridge designs which conserve steel—showed an average saving in that metal of approximately 20 per cent. First Award of $7,627 went to Elwyn H. King, Long Beach, Calif., whose welded design of a 7-span deck girder bridge indicated a saving in steel of 24 per cent over what was actually used in erecting the bridge by riveting. Kiser Dumbauld of the Ohio State Highway Department received Second Award of $3,635 for his redesign of one of the State's bridges which indicated a saving in steel of 18 per cent. Third Award of $2,078 was shared by Thomas Kavanagh of New York University and Leo Coff, Consulting Engineer, New York, N. Y. Their welded design showed a steel saving of 21 per cent. Ten honorable-mention awards were also made.

Several bridges based on past Foundation award designs have already been or are being erected.

Fork-Truck Operator Manual

A 24-page comprehensive booklet for use in training lift-truck operators has been prepared by the Hyster Co., 2902 N. E. Clackamas St., Portland 8, Oreg.

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This literature may be obtained from Hyster or by using the Request Card at page 18. Circle No. 358.

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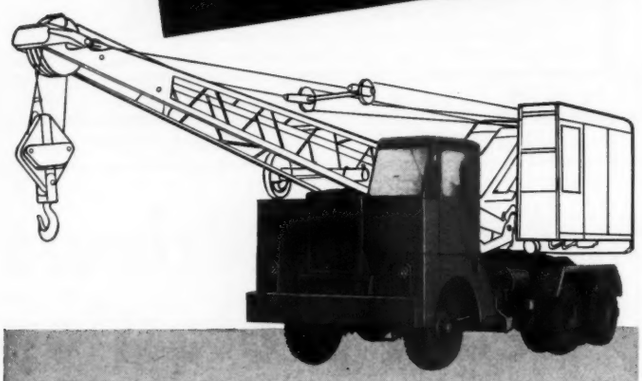

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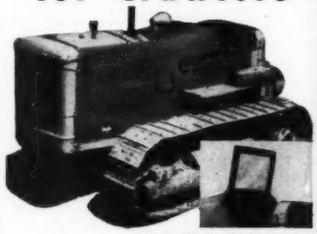

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Avoid Legal Pitfalls

Edited by A. L. H. STREET, Attorney-at-Law

These brief extracts of court decisions may aid you. Local ordinances or state laws may alter conditions in your community. If in doubt consult your own attorney.

Govt. Contractor Liable For Employee's Drowning

THE PROBLEM: *A Government contractor established a recreation center for employees on Guam, including swimming facilities. An employee swam into a dangerous channel—where swimming was forbidden—to rescue two men who had called for help, and was drowned. Was the contractor liable to the employee's dependents under a Federal workmen's compensation act?*

THE ANSWER: Yes. (O'Leary v. Brown-Pacific-Maxon, Inc., 340 U. S. 502, 71 S. Ct. 470, decided by the United States Supreme Court.)

The court said what seems to reflect reasoning adopted by the appellate courts of most states in interpreting state workmen's compensation acts: "Workmen's compensation is not confined by common-law conceptions of scope of employment. . . . The test of recovery is not the causal relation between the nature of the employment of the injured person and the accident. . . . Nor is it necessary that the employee be engaged at the time of the injury in activity of benefit to his employer. All that is required is that the 'obligations or conditions' of employment create the 'zone of special danger' out of which the injury arose."

Three of the nine justices of the Supreme Court disagreed on the point that an award of compensation was properly made in this case. One of the Texas courts of civil appeals has gone so far as to decide that if a construction company knowingly permitted its employees to gamble with dice on working premises while off duty, compensation should be awarded to the dependents of an employee who was shot by another for refusing to pay a bet he lost. (American General Insurance Company v. Williams, 222 S. W. 2d 907.)

Subcontract Did Not Call For Trench Refilling Too

THE PROBLEM: *Federal building specifications required the general contractor to do all filling, backfilling, and grading required by new construction. By agreeing to "do the electrical work . . . as per plans and specifications", did a subcontractor bind himself to refill trenches excavated for installation of electrical ducts?*

THE ANSWER: No. (Sagl v. Hirt, 52 N. W. 2d 721, decided by the Minnesota Supreme Court.)

The court reasoned: Under ordinary circumstances, an excavator of trenches might be expected to refill them. But here the general contractor was bound to foresee that the prime-contract specifications were so worded that the subcontractor would understand that his bid did not obligate him to refill.

The subcontractor, having been ordered by the general contractor to refill the trenches, was entitled to extra pay measured by the reasonable value of the refilling.

Contractor Can Collect For Delay in Accepting

THE PROBLEM: *A housing construction contract had been 99.6 per cent performed at the completion date fixed by the contract as extended by excusable delays. But the Government refused to accept the job, and assessed liquidated damages against the contractor at $200 per day, as provided by the contract, aggregating $11,200. The deficiency in completion did not prevent occupation of the housing.*

Was the contractor entitled to collect the $11,200, plus an allowance of $2,454.75 to cover cost of fuel, light, power, and insurance accruing during the inexcusable delay in accepting the substantially completed work?

(Continued on next page)

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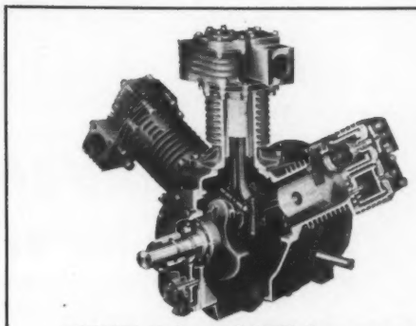
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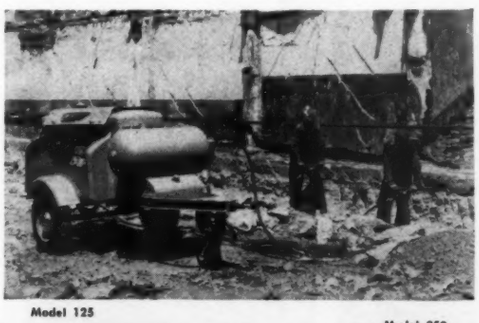
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Model 250

Model 600

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Avoid Legal Pitfalls

THE ANSWER: Yes. (Continental Illinois National Bank & Trust Co. v. United States, 101 Fed. Supp. 755, decided by the United States Court of Claims.)

Injury to Minor Not Covered Under a Cost-Plus Contract

THE PROBLEM: *A cost-plus contract covering a state project required the contractor to comply with labor laws and to secure necessary permits. A minor was hired without a permit, and was injured. This resulted in a double workmen's compensation award against the contractor. Was the contractor entitled to reimbursement for this expense under the contract?*

THE ANSWER: No. (John A. Johnson & Sons v. State, 109 N. Y. Supp. 2d 677, decided by the New York Supreme Court, Appellate Division, Third Department; affirming a judgment of the New York Court of Appeals, 106 N. Y. Supp. 2d 49.)

The court said that it was immaterial that the contractor may have believed that the young man, 17 years old, was over the statutory age, 18.

Engineer's Pay Rights When Project Abandoned

THE PROBLEM: *All costs of projected municipal construction were expected to be paid out of a special fund. The project was abandoned and, because of such abandonment, no special fund materialized. Was the municipality's general fund liable for the reasonable value of services rendered by the engineers?*

THE ANSWER: Yes. (Vail v. City of Paris, 101 N. E. 2d 861, decided by the Illinois Appellate Court, Third District.)

Specifically, the case involved liability of a general fund for services of attorneys under an abandoned project, but the court's opinion recognized that services of engineers fell in the same category.

Surety Covered Payrolls, Was Liable for Wage Taxes

THE PROBLEM: *A public contractor, unable to meet payrolls, called on his surety to advance funds for that purpose. The surety gave bank drafts under instruction that they should cover the contractor's payroll checks. The surety's bond covered payment of wages. Was the surety liable for federal withholding taxes on the wages?*

THE ANSWER: Yes. (United States v. Swedlow Engineering Co., 190 Fed. Supp. 796, decided by the United States District Court, Southern District of California, Central Division.)

When Do Job Employees Represent Contractor?

THE PROBLEM: *A public sidewalk was torn up during a street improvement. If an employee who "appeared to be in charge of the work" gave an assurance to a pedestrian that he could safely proceed along the walk, was the contractor bound by this assurance?*

THE ANSWER: No. (Bazemore v. MacDougald Construction Co., 68 S. E. 2d 163, decided by the Georgia Court of Appeals.)

The court said that before the employee's assurance would bind the contractor it must be proved that he was authorized by the latter to give such assurances. "An agent cannot, beyond the scope of his agency, affect the principal by his declarations."

Material Supplier Was Not Under Federal Law

THE PROBLEM: *Defendants produced in Missouri rock, ballast, crushed stone, and asphalt mix. This they sold in the state for use on state and Federal highways there and also for use on Missouri River improvements. Were defendants' employees covered by Federal wage laws, on a theory that defendants*

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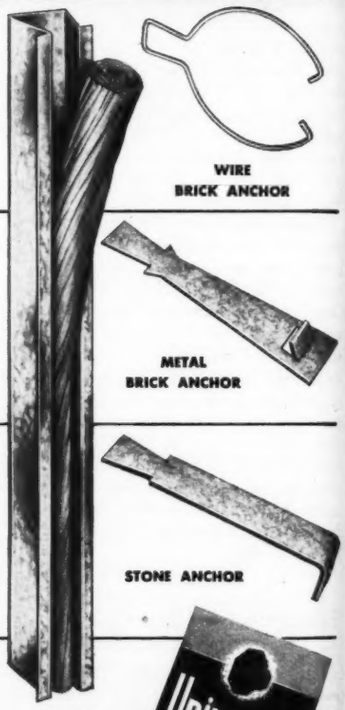

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"U" TYPE STONE ANCHOR

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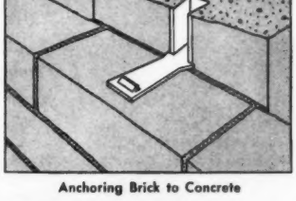
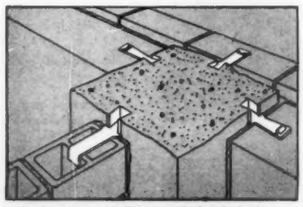
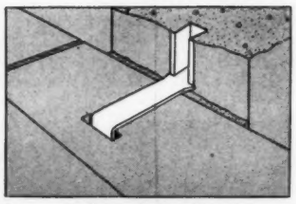
STONE ANCHOR



Anchoring Brick to Concrete



Anchoring to column with brick facing and tile partition, showing versatility of Dovetail Anchor Slot and Anchors.



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were engaged in producing goods for interstate commerce?

THE ANSWER: No. (Tobin v. Johnson, 100 Fed. Supp. 491, decided by the United States District Court, Western District of Missouri.)

Interest on Disputed Items

THE PROBLEM: *Where it took a lawsuit to determine the amount due to a prime contractor from a subcontractor for breach of a contract—various items being in dispute—did judgment in the former's favor properly include interest on the principal amount?*

THE ANSWER: No. (Hancock v. Johnson, 244 Pac. 2d 285, decided by the Wyoming Supreme Court.)

The decision is in line with the general rule of law that no judgment for a sum not previously fixed should include interest prior to the date of the judgment. From this date on, of course, interest runs.

Electric Shocks in Operation of Crane

THE PROBLEM: *A highway subcontractor knew that contact between a crane operated by his employees and an overhead uninsulated electric line would occur if care were not used. Contact did occur, injuring an employee. Was the municipality that owned the line liable to the injured man, on a theory of negligence in maintaining an uninsulated line?*

THE ANSWER: No. (Mintz v. Town of Murphy, 69 S. E. 2d 849, decided by the North Carolina Supreme Court.)

Incidentally, the court recognized that, in operating an electric plant as a public utility, a municipality is under the same liability for accidents as a private corporation operating a similar business.

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Navy Adopts Tilt-Up Construction

Building From the Outside In Is a Feature in Erection of Bureau of Ordnance Pomona Plant

• FOR the first time the Navy Civil Engineers are using tilt-up construction on a large scale. The project is a huge plant at Pomona, Calif., which is being built for the Navy Bureau of Ordnance and will be operated by the Consolidated Vultee Aircraft Corp.

Buttress & McClellan, Inc., Los Angeles, Calif., holds the contract and the job is scheduled for completion this year. The firm has a patented process for tilt-up construction, which will mean the erection of five main buildings and five auxiliary buildings (providing 1,300,000 square feet of space) more cheaply, easily, and quickly than would be the case with conventional methods. An added advantage is that tilt-up needs fewer critical materials.

A crane using a 4-point hookup with running sheave lifts a wall slab into place at the Pomona plant. Each panel has cast plates with lifting-attachment holes. *U. S. Navy Photo*

From the Outside In

The principal feature of tilt-up construction is the forming and casting of wall panels on a deck slab. The panels are subsequently placed in position by cranes, then secured by steel columns. This is a reversal of the usual methods, whereby the steel framework is erected first and the concrete placed afterwards.

The reinforced-concrete wall panels on the Pomona job are 20 x 26 feet and are 5½ inches thick. Each panel weighs about 20 tons. The use of a membrane between panels makes it possible to cast them singly or upon each other in multiples, as desired.

Handling by Cranes

Working from the inside of the building, and without the need of scaffolding, a crane lifts the panels into place. The crane uses a 4-point hookup with running sheave for easy load distribution. Panels may be lifted in 8 days, due to the use of small amounts of an admixture for higher early strength.

Five sets of panel-attachment plates are cast in each wall panel near the joints, and each panel also has cast lifting-attachment holes, which are patched after erection. The attachment is a tapped insert cast in the panel in the same way

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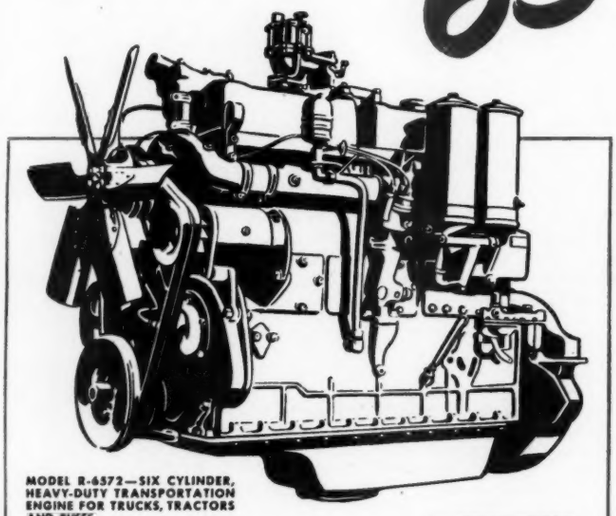

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Further information or descriptive literature can be secured from any advertisers in this issue of CONTRACTORS AND ENGINEERS. Just write name of manufacturer and product of interest to you on the extra line provided on the post card facing page 18, fill in your own name and industry connection, mail to us and we'll do the rest.

CONTRACTORS AND ENGINEERS

470 Fourth Ave., New York 16, N. Y.

Here we see steelworkers attaching the steel columns to the concrete panels. Temporary knee bracing still supports the panels. *U. S. Navy Photo*

as those cast in the deck.

Positioning of Wall Panels

Grout leveling pads are used at each end of the grade beams. The panels are set on these leveling pads and the intervening space is later filled with dry pack for sealing.

To keep the wall panels in place until the steel framework of the building is erected, steel knee bracing is used. Knee-brace supports are adjustable. A turnbuckle arrangement is used near the floor for plumbing panels. Deck attachments are cap-screwed into tapped inserts cast in the deck.

Steel Framework

The steel framework follows the erection of the wall panels, the cast-in plates affording an easy and speedy method of welding studs in place. Holes are drilled in the steel plates to insert weld-on studs. The studs are then capped with fastening clips, which hold the wall panel to the column flange.

Finally, after the steel columns have been erected and secured at the vertical 5½ x ½-inch panel joints, the length of the panels is filled to the column flange with a bitumastic joint filler.

Personnel

Capt. A. I. Flaherty, CEC, USN, District Public Works Officer for the Eleventh Naval District, is Officer-in-Charge of Construction at the Pomona plant. Comdr. Franklin G. Jansen, CEC, USN, is Resident Officer-in-Charge; Comdr. W. G. Byrne, CEC, USNR, is Assistant Resident Officer-in-Charge, Construction; and Lieut. B. V. Stewart, CEC, USNR, is Assistant Resident Officer-in-Charge, Design.

Goodyear Runs AEC Plant

Goodyear Tire & Rubber Co., Akron, Ohio, has been selected as operating contractor for the new Atomic Energy Commission plant to be built in Pike County, Ohio. (See C. & E., Oct., 1952, pg. 8.) The company will put individual units of the 6,500-acre plant into operation as they are completed, and will eventually be the principal employer of about 4,000 persons. Union Carbide & Carbon Corp., New York, N. Y., operating contractor for the atomic plants at Oak Ridge, Tenn., and Paducah, Ky., will assist the company and help train key employees for Goodyear; Albert J. Garcia is manager of the operation; Dr. Charles R. Milone is Superintendent of the Atomic Research Laboratory; and Dr. Richard B. Stambaugh is Superintendent, Works Laboratory.

The $1,219,000,000 plant, for which Peter Kiewit Sons' Co., Omaha, Nebr., is principal construction contractor, will produce Uranium-235.

A Film About Aggregates

A new color-sound movie, "Aggregates Unlimited", has been produced by Iowa Mfg. Co., Cedar Rapids, Iowa, manufacturer of Cedarapids equipment. The film, with narration by popular radio commentators, presents a completely new approach to the aggregate situation. It emphasizes the importance of a modernized highway system in regard to the national economy and ties in directly with the efforts of the construction industry to promote more and better roads at low cost. The movie points out that high cost is one of the main reasons for the serious lag in highway construction, and explores the question: Is the nation getting its tax dollar's worth of roads?

Copies of this 26-minute film may be borrowed for showing to contractors and civic groups. Write to Kenneth Lindsay, Executive Vice President and General Sales Manager, Iowa Mfg. Co., Cedar Rapids, Iowa.

Two Compass Models

Two new compasses have been announced by the A. Patrick Co., P. O. Box 28, Westwood, N. J. The Omicron beam compass extends to a 72-inch radius. A locking lever releases or locks in any dimension and permits minute adjustments—a one-hand operation. The Model 12 bow compass has a trigger for opening. A smooth rod with no threads guides the adjustment mechanism.

Further details may be secured from the company. Or use the Request Card at page 18. Circle No. 309.

Telsmith Scalper and 13-B Gyratory Crusher
Telsmith Gyrasphere Crusher
Telsmith Vibro-King Sand Screen, Telsmith Super-Scrubber, Telsmith Sand Classifier

Combination
GRAVEL AND QUARRY PLANT
for MAY SAND & GRAVEL CO., FORT WAYNE, IND.

ENGINEERED by TELSMITH

TELSMITH
Equipment in this Plant

- 4' x 10' Single Deck Scalping Screen
- 13-B Gyratory Breaker
- 4' x 12' Double Deck Vibro-King Sand Screen
- 84" x 12' Super-Scrubber
- 30" x 25' Twin Screw Sand Classifier
- 4' x 12' Triple Deck Vibro-King Coarse Aggregate Sizing Screen
- 36-S Gyrasphere Crusher

● May Sand & Gravel Co. supplies the Fort Wayne, Indiana area with a variety of aggregate — for state highway use, ready-mix concrete, railroad ballast, etc. This versatile, flexible, combination plant with about 200 tons per hour capacity, was designed by Telsmith engineers to process a sand and gravel deposit located over a workable quarry. Three sizes of stone, and two sizes of sand can be made at the same time. Its 13-B Telsmith Gyratory Breaker and Telsmith 36-S Gyrasphere do all the crushing — now making minus 3½" plus 2", minus 1¼" plus ¼", and minus ¾" plus ¼" gravel and stone. In addition to concrete sand, either mason sand, or bituminous mix sand can be made. ● Telsmith planned plants pay profits. Get Bulletin 266.

GQ-22

SMITH ENGINEERING WORKS, 4014 N. HOLTON STREET, MILWAUKEE 12, WISCONSIN

Cable Address: Songworks, Milwaukee

51 East 42nd St. New York 17, N. Y. · 211 W. Wacker Drive Chicago 6, Ill. · 713 Commercial Trust Bldg. Philadelphia 2, Pa. · 232 Main Street Cambridge 42, Mass. · Beelick Eqpt. Co. Milwaukee 3, Wis. · The McLean Co., 3122 Lakeside Ave. Cleveland 14, Ohio

Marens Eqpt. Co., 432 Main St., Rochester, Mich. ● Clyde Eqpt. Co., Portland 9, Ore., & Seattle 4, Wash. ● Mines Eng. & Eqpt. Co., San Francisco 4, Calif.
Rish Eqpt. Co., Charleston 22, & Clarksburg, W. Va.—Roanoke 7, & Richmond 10, Va. ● Interstate Equipment Co., Statesville, N. C.

Winches help move the partially completed water-intake structure from the Gravesend dock out into the main channel . . .

where three tugs, escorted by two launches and a Port of London Authority vessel, latched on to the unit and towed it to a berth in Tilbury. The trip took only 2½ hours.

Concrete Box Floated Into Place

River Thames Provides Construction Site And Transportation for Water-Intake Unit

• AN unusual method of constructing and placing a reinforced-concrete caisson was adopted in the spring of this year when a 4,200-ton main section of a water-intake jetty for the Vacuum Oil Co. was put into position at the company's oil refinery at Coryton, England.

For the successful operation of an oil refinery, a large volume of water is necessary for cooling purposes, both in the power station and in the oil-processing plant. In the case of the Coryton refinery, built on the Thames Estuary, ample water was available from the river, but this involved the rather tricky problem of constructing a suitable water intake on the bed of the river to house the pumping machinery.

The chief difficulty of the in-place construction of such an intake lay in the dangerous river currents at this point. Here, too, the river is 25 feet at low water and there is a 25-foot lift on the tide. To build the structure on the spot would have necessitated a cofferdam using large quantities of steel-sheet piling. For this reason, and influenced by the problem of the speedy delivery of essential materials, the London firm of civil engineering contractors, John Laign & Son, Ltd., working in conjunction with The Lummus Co., Ltd., of London and New York, decided that a less conventional method of procedure would be easier and more economical.

"Mulberry" Method

Basing their plans on the Mulberry Harbor principle, conceived during World War II, the contractors propose to carry out most of the constructional work at a suitable site and to tow the unit to Coryton for sinking on the riverbed there.

During the war floating anti-aircraft towers and forts had been built at the Red Lion Wharf, Gravesend, and this was considered a suitable site on which to carry out the early stages of the work. Disused and overgrown and covered to a depth of 6 feet 6 inches with 6,000 cubic yards of mud deposited by the tide, the wharf had to undergo a major cleanup before work could begin.

The site, however, proved a very useful one. Though at low water it was dry, at high tide it was covered with water to a depth of 9 feet. Converted into a dry dock by closing the entrance with double sheet piling filled with ballast, it provided a suitable bed on which a firm base for the structure could be built to a height governed by the depth of water available. Subsequent lifts of concrete would be added later in a wet dock.

Work at Gravesend

The floor of the dock at Gravesend consisted of an existing lightly reinforced slab about 18 inches thick and it was this slab that carried the weight of the caisson in its early stage of construction, before it went to Tilbury for completion. A concrete screed course was laid in the bottom of the dock to level off the existing base. Hollow tiles were laid on this bed to insure that when the caisson was floated the water could get underneath it. The tiles were covered by a layer of building paper upon which the floor of the caisson was laid. The concrete floor of the caisson was 1 foot 8 inches thick.

Built up to a height of 12 feet 6 inches in four months, in spite of a month's delay due to steel shortage, this 100 x 53-foot structure was divided into six main compartments. External walls were 1 foot 6 inches thick and there were three longitudinal walls 9 inches thick and nine transverse walls of the same thickness.

To control the flooding of the unit, eighteen 6-inch valves were built into the lower part of the walls. When constructed to a height of 12 feet 6 inches, the caisson was tested for watertightness by removing the sheet-pile dam and filling it with

Now almost completely constructed, the 52-foot-high intake jetty is towed eight miles down the Thames to its final position alongside the refinery. The 4,200-ton structure had a draft of 29 feet.

The water intake will supply 45 million gallons of water every day. It will be connected to shore by a concrete roadway.

water as the tide came in, then waiting for the tide to fall.

To prevent the structure from floating before the day for its removal, it was kept filled with water. On the day of its maiden voyage the water was emptied by opening the valves in the side walls, and the "Flying Red Horse" floated off its hollow-tile base without difficulty at a draft of 8 feet 6 inches as had been calculated by the engineers. This took place one hour and twenty minutes before high tide—and its journey to Tilbury was begun. There it would be placed in wet dock for the completion of a further stage of its construction.

On to Tilbury

Winches were used to get the unit moving until it entered the main stream from the Gravesend dock with about 2 feet only to spare. With reinforced steelwork bristling, the

The concrete framework used to support the huge side pressure on the caisson.

partially constructed caisson was towed by three tugs and escorted by two launches and a Port of London Authority vessel. In charge of piloting the concrete structure was G. Milton, who had taken part in Mulberry maneuvers off Arromanches during the invasion of Normandy.

The journey to Tilbury was completed in 2½ hours and there the structure was placed in a berth alongside liners from many parts of the world. Completely surrounded by a floating boom (from which the joiners and steel fixers worked) to protect it from drifting craft, the floating unit increased in height by a series of five 2-foot lifts as concrete was poured from scaffolding erected inside it. Water ballast was introduced from time to time to keep the shuttering within reach of the workmen on the floating boom.

When a total height of 30 feet had been reached, all the water ballast was removed and a bracketed scaffold erected around the caisson. Concreting continued in this way until the twenty-second lift was reached, when 600 tons of 15:1 lean concrete was placed in the bottom of the caisson below floor level to insure that the designed draft of 29 feet for its subsequent journey to site would be achieved. This draft, which is deeper than that of many liners, was necessary to give the caisson sufficient stability in the river.

As the structure grew, care was taken to keep the unit on an even keel and any listing was adjusted by the placing of ballast. The draft was checked each day by reading markings at each corner of the structure. At the water-intake opening, steel grids or grizzlies would eventually be inserted to prevent the entry of obstructions to the pump inlets. This opening was temporarily closed by steel-sheet piling.

Big Structure

Because the structure was a floating one, reliance in setting out had to be placed on measurement alone from base lines, the use of instruments being impracticable.

The total height of the structure as developed at Tilbury was 52 feet 6 inches and the final two lifts of 2 feet each with the deck were added after being placed in position at Coryton. The three longitudinal walls and nine transverse walls run below the bottom floor slab, which is 20 feet above the base. There are also longitudinal and cross braces 13 inches wide, the lower ones being 32 inches deep and the upper ones 18 inches in depth.

Light timber units, prefabricated at the central joinery works of the contractors and each 2 feet deep and varying in width from 2 to 6 feet according to its position, were used for shuttering for the concrete walls. The predetermined water-cement ratio in the concrete was carefully maintained and an average cube compressive strength of 6,000 pounds per square inch at 28 days was achieved. Power-type immersion equipment was used for vibrating the concrete.

Final Move

On March 6 last, this massive structure was towed by tugs a distance of about 8 miles down the River Thames and sunk into its position alongside the refinery, to which it will ultimately give a daily supply of 45,000,000 gallons of water. To fill in any irregularities between the prepared bed at Coryton and the caisson itself, tubes for grouting un-

(*Concluded on next page col. 4*)

Announcement

Torque Converter Drive in Road Rollers Offered by Buffalo-Springfield—another "First" Pioneered by the Leader in Roller Design

With the new Buffalo-Springfield Torque Converter Drive, operators can roll at *any* speed from 1 to 5 mph without shifting gears. Controlled by a unique governor set up, the torque converter will deliver whatever power is required (up to full engine capacity). Power changes instantaneously to suit varying requirements. This means that variations in materials and grade are compensated for automatically! Slipping the roll is virtually eliminated. Courses of all kinds are compacted more smoothly, easily and efficiently than ever before! The new transmission is offered as *optional equipment* on its 8-16 ton 2-axle tandems, 3-axle tandems and 3-wheel rollers.

This is one of the first 3-axle tandems with Torque Converter Drive at work on the New Jersey Turnpike—built by Buffalo-Springfield for Geo. M. Brewster & Son of Bogota, New Jersey.

Buffalo-Springfield Torque Converter Drive has been *proven conclusively* in the field. For two construction seasons, a fleet of 2 and 3-axle tandems has operated on a wide variety of work including all courses of the New Jersey Turnpike—from special classified sub-grade material and loose stone base to bituminous concrete wearing surfaces.

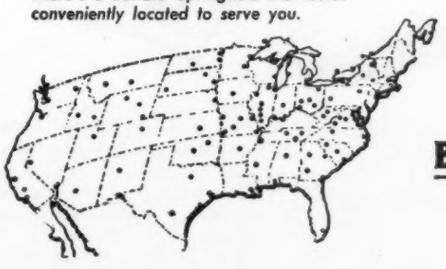
With the introduction of the new drive you now have your choice of two great transmissions to meet every rolling requirement. Exclusive Torque Converter Drive to give you an *infinite* number of speeds, *all* at full power. And Buffalo-Springfield's exclusive 4-speed transmission which was introduced in 1945 to provide *more* speeds at full engine power than either 2 or 3-speed transmissions.

Naturally, rollers with Torque Converter Drive are built with the same characteristics of long life and low maintenance that have made Buffalo-Springfield famous for more than 60 years.

See your Buffalo-Springfield Distributor or write the factory for complete information on Torque Converter Drive.

NOTE: 4-speed transmission standard equipment on all rollers except KT-7. Torque Converter Drive is available at extra cost on models listed above.

There's a Buffalo-Springfield Distributor conveniently located to serve you.



BUFFALO-SPRINGFIELD ROLLER COMPANY

BUFFALO SPRINGFIELD — THE STANDARD OF COMPARISON

SPRINGFIELD, OHIO

THE LEADER IN ROAD ROLLER DESIGN AND MANUFACTURE

CHECK THE RED REQUEST CARD!

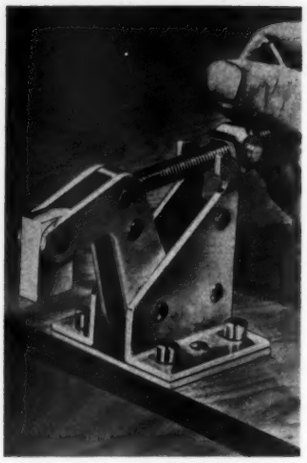
For further information on the new equipment, new materials, and new literature described in this issue of Contractors and Engineers check the item number on the Red Request Card bound in at page 18. No obligation, of course, and we will forward your request directly to the manufacturer.

CONTRACTORS AND ENGINEERS, 470 Fourth Avenue, New York 16, N. Y.

Quick Fixture Clamp

A new fixture clamp has been introduced by Centinela Industrial Supply Co., 11930 Inglewood Ave., Hawthorne, Calif. It may be used for all milling, drilling, riveting, and assembly fixtures.

A twist of the wrist is said to remove the trunnion from the retaining hook in the mounting bracket, and the full-open position gives unobstructed vertical clearance for removal of finished work. The company claims that the firm-gripping capacity of the new clamp, combined with its non-flexing design, eliminates chatter during milling or intermittent cutting operations.



The screw operation and vibration-absorbing spring-bearing trunnion are said to insure a firm steady grip in riveting or other abusive fixture applications. The new unit can be closed and adjusted in one operation. It is constructed of roll-forged steel instead of pressed metal and has a black oxide finish. Cadmium plate or electro-zinc finishes are available when specified. Available sizes include 3 and 6-inch throat depths.

Further data may be secured from the company. Or use the Request Card at page 18. Circle No. 254.

Booklet on Pipe Piles

A revised edition of its booklet on foundation piles has been published by Armco Drainage & Metal Products, Inc., 703 Curtis St., Middletown, Ohio. The new 8-page booklet covers pipe shells, pile shells, and caissons. It deals with sizes, end preparation, mill service, field advantages, and contains specifications and tables on dimensions and properties of spiral-welded pipe piles as well as data on Hel-Cor pile shells.

This literature may be obtained from Armco, or by using the Request Card at page 18. Circle No. 276.

Concrete Box

(Continued from preceding page)

der the caisson were incorporated.

In its completed form the water intake will stand out in the Thames Estuary off the Essex bank at Coryton rather like a jetty. It will, in fact, be connected with the shore by a reinforced-concrete roadway built on steelwork and box piles and also by a pipe bridge. The roadway, which will run from the eastern end of the caisson and enclose it on three sides, will, together with a structural steelwork and piled extension at the western end, serve to protect the intake and pipe bridge from damage by drifting craft.

Piping from the intake will include three large pipes of 42-inch diameter and three of 39-inch diameter. The structure carrying them will be of steel on box piles.

It likes the Big Pikes . . .

On the punishing turnpike jobs, original equipment producers know their products will move inches, feet, yards or miles . . . thanks to a Shunk blade.

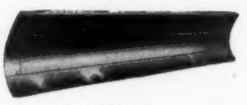
On a big, tough grader, 'dozer or scraper, the Shunk blade really likes the big pikes.

Highway construction and maintenance contractors look to a Shunk blade for endurance and long wear. They specify a Shunk for its superior quality.

Distributors everywhere know that their recommendation of a Shunk blade for turnpike jobs will be backed by Shunk service and reliability.

Put this rugged work horse to work on your next pike job. More information will be gladly provided.

GRADER BLADES



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Shunk MANUFACTURING COMPANY

In Our 98th Year

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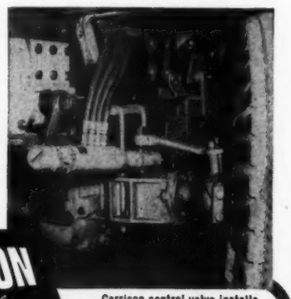
Makes Steering Easy!



GARRISON Hydraulic STEERING BOOSTERS

Garrison control valve installation on front axle of FWD heavy-duty truck. The easily-installed valve and cylinder absorb all the shock load.

FOR FWD TRUCKS

Install Garrison Hydraulic Boosters on FWD heavy-duty trucks . . . Steering becomes easy, even with a full load under the worst driving conditions.

LESS FATIGUE—Drivers stay fresher, cover more miles in a day, handle a greater number of payloads because the *booster provides most of the steering effort!*

GREATER SAFETY—Garrison Boosters absorb road shock, increase control and add to safety of driver and equipment.

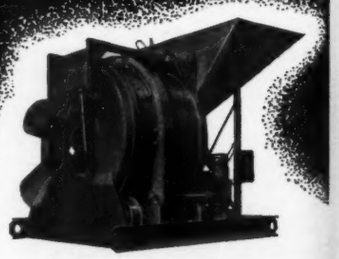
EASY INSTALLATION—Garrison Boosters are available as original factory approved equipment. In kit form, they are easily installed by dealers, or in maintenance shops.

Write today and ask for details about your specific needs!

GARRISON Manufacturing Co.

1500 SOUTH SANTA FE AVENUE LOS ANGELES 21, CALIF.

CMC First IN BIG JOB MIXERS



I-2-3 YARDERS FOR INCREASED CENTRAL PLANT PRODUCTION

These big-producing CMC Mixers are known for increased production in central plants on large construction operations or in commercial ready-mix plants. A half century of Mixer "Know-How" assures owners of engineering that means faster, smoother and more efficient operation. All adding up to greater profits for owners.

- Hydraulic finger-tip controlled charging and discharging.
- Timken bearings throughout.
- Machined drum tracks.
- Silent, rugged transmission.
- Dependable, long-life construction.
- Renewable hardened steel drum liners.

Write for Bulletin M-56

CONSTRUCTION MACHINERY CO'S. WATERLOO, IOWA, U.S.A.

Industrial Center For G-E in Kentucky

Clearing, Grading, Steelwork, Concreting, Pipelining, Involved In This $100,000,000 Job

An aerial view of General Electric's new plant in Kentucky. When complete, the project will include five huge manufacturing plants.

• PRIVATE industry is still on the move—and in general that move is toward the south. A recent plant expansion southward is the building of General Electric's new plant adjoining Louisville. Turner-Struck is general contractor, representing a joint venture of Turner Construction Co., of New York, and Struck Construction Co., of Louisville. Cost of the ultimate project will be over $100,000,000, G-E estimates. This does not include production machinery, which will up the worth of the plant to approximately $250,000,000.

The new plant, an industrial center in itself, will turn out G-E's line of major appliances. Work on it, which started July, 1951, is proceeding under stage construction, and the completion date is set for the fall of 1954. At a preview last fall, however, G-E distributors saw the first complete appliances to come off the assembly line. The 1,000-acre site is 1½ miles south of Buechel and 9 miles southeast of Louisville. G-E selected it because of its nearness to an adequate labor market, ready supplies of component assemblies, excellent transportation facilities, and its proximity to the center of distribution of the company's major appliances.

Initial contracts included three of the main manufacturing buildings and the powerhouse. Under present plans, the project will ultimately include five huge manufacturing plants, each with its own offices; a warehouse; a powerhouse; laboratory and research, personnel, and administrative buildings; water and waste-pumping stations; garage; propane-storage units; an incinerator; railroad yards; complete water, sewage, gas, and electric facilities; roads; and a number of small buildings.

Moves 1,500,000 Cubic Yards

Codell Construction Co., Winchester, Ky., handled the clearing and grading under a subcontract. In its natural condition the site sloped down to the west with an average grade of 1.5 per cent. To level the area for the construction of the manufacturing buildings, over 1,500,000 cubic yards of dirt had to be pulled out of the eastern part of the site and placed on the western part.

Caterpillar dozers and a Fleco root rake cleared the area after the heavy trees had been cut down. Then Codell brought in a big fleet of earthmovers—both crawler and rubber-tired rigs. The scrapers included 9 Tournapulls, 2 Terra Cobras, 1 Heiliner, 2 Euclids, 4 Caterpillars, 3 LeTourneaus, and 1 Bucyrus-Erie. There were 30 tractors working on the job—Caterpillar D8's mostly, with a couple of International TD-24's and some Cat D7's and D6's. An Adams 612 and 4 Caterpillar No. 12 motor graders took care of the leveling and dressing, and kept a crown on the haul roads.

The top 9 inches of topsoil was stockpiled and will be replaced when the work is completed. Ground in

(Continued on next page)

TRANSITS and LEVELS

NEW OR REBUILT SALE OR RENT

HEADQUARTERS FOR REPAIRS — any make

We will buy or trade in old Transits, Levels, Alidades, etc. Send instruments for valuation.

Write for Catalog EC-31 of Engineering Instruments, Engineering Field Equipment and Drafting Room supplies.

WARREN-KNIGHT CO.
Mfrs. of Transits & Levels
136 N. 12th St. • Philadelphia, Pa.

HIGH UP

. . . on the list of "Economy Short-cuts" for the $4 Million Nassau County Sewer Expansion was . . .

FOSTER RENTAL PILING

TELEPHONE VALLEY STREAM 5-2340 5-2349 5-2350

Hendrickson Bros. Inc.

GENERAL CONTRACTORS
EXCAVATING · GRADING · HEAVY CONSTRUCTION

62 NORTH CENTRAL AVENUE
VALLEY STREAM, N. Y.

L. B. Foster Co.
11 Park Place
New York 7, N. Y.

Re: N. C. Sewage Disposal Plant

Gentlemen:

Because this job was near the ocean, we had to get Interlocking Steel Sheet Piling to hold back mud at subgrades, to assure dry working conditions. Contract requirements made time of utmost importance, so we turned to Foster for prompt delivery of just what we needed. Needless to add, your prompt delivery was taken for granted -- and furthermore we figure that we effected a considerable saving because of your low rental rates.

Yours very truly,

HENDRICKSON BROS., INC.

Arthur J. Hendrickson

Arthur J. Hendrickson, President.

1,000 feet of Foster Rental Piling serviced 10,000 feet of this job for Hendrickson Bros. They rented 1,000 ft. to be driven in the relatively soft subsurface a total of ten times—piling being in place a week before pulled for re-use in advanced location. The complex piling requirements were best serviced from Foster's large rental stocks with the exact lengths and the exact sections the job required, at economical low rental rates.

Let us quote you on our low-cost piling rentals—prompt service from five Foster warehouses. Send for Free Piling Brochure illustrating diagrams of all standard-make sections, ask for Bulletin CE-1.

66-inch diameter precast conduit at an average depth of 35 ft.—placed atop a 7-inch concrete slab.

Piling holds back mud for The Sanitary Trunk Sewer conduit which ran 7 miles on Long Island's South Shore.

RAILS—TRACK EQUIPMENT • PIPE • WIRE ROPE

L. B. FOSTER CO.

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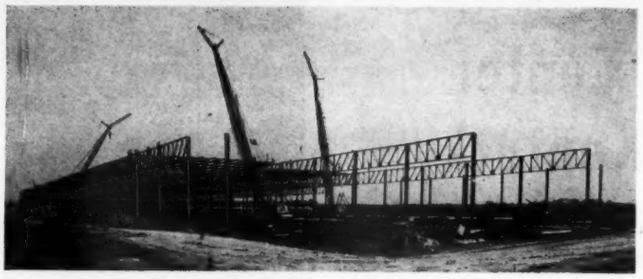
Industrial Center For G-E in Kentucky

(*Continued from preceding page*)

the area of the manufacturing buildings ranged in elevation from 510 to 530. This was brought to a tight 519. The floors of all manufacturing buildings are at 520. Codell averaged 20,000 to 25,000 yards per day working two shifts. When everything was clicking, yardage reached peaks of 30,000 per day. The average haul ran about 2,000 feet. The maximum stretch was 4,000 feet. Weather held out fine most of the 1951 summer.

The fill had to be 95 per cent Proctor density or above. Checks were made by Toledo Testing Laboratory. Dirt went down in 6-inch lifts, followed by 10 to 15 passes with three large 750-psi sheepsfoot rollers. A Cat DW10 carrying a 3,000-gallon water tank was put to work whenever the optimum moisture dropped off.



Building No. 2 goes up at G-E's new plant.

Miles of Underground Pipe

The underground-pipe installation on this project is a big item. For manufacturing buildings Nos. 1, 2 and 3 only, it amounts to 70,000 linear feet.

There are six main pipelines. Storm water will run through 24,000 feet of reinforced-concrete pipe ranging from 12 to 120 inches in diameter. Sanitary sewage will be carried by 13,000 feet of vitrified-clay pipe, 10 to 24 inches in size. Cast-iron mains 12 to 24 inches in diameter are being used for the 10,000 feet of mill-water pipe and 8,000 feet of domestic-water pipe. Outgoing rinse water from the plant will feed through 16,000 feet of 15 to 36-inch vitrified-clay pipe.

Opening the trenches for this pipe was a big job. George M. Eady Co., Inc., of Louisville, and Codell Construction Co., had the joint-venture subcontract. Trenching started in November, 1951, and the first phase was completed by October, 1952. Quantities amount to 200,000 yards of earth and 50,000 yards of rock. The average cut is about 14 feet; the maximum, 25 feet. Whenever possible, scrapers opened up the trenches on about 60,000 yards of the work. They swept in and out of the cuts holding a backslope of about 2 to 1. In addition to the scrapers, Eady-Codell had 3 Lorain Model 820's (a 2-yard dragline, a 2-yard backhoe, and a crane); a Lorain 78 with a shovel front; a 1-yard Lorain 50, a ¾-yard Lorain 41, and a ½-yard Lorain 30, all with backhoes; a 1-yard Northwest backhoe, and a ¾-yard Bucyrus-Erie 22B with a backhoe.

Where the grade line of the trench was in earth, the backhoes left the bottom a foot or so high. This allowed rain water to run off the surface and reduced softening of the subbase. A clamshell took the bottom down to grade just ahead of pipe laying. This method paid off during the constant winter rains; it saved time drying out the trench and setting pipe, and insured a firm foundation for the finished pipeline.

Most of the dirt was simply cast to the side for use later as backfill. The excess was carried off by a fleet of five 11-yard rear-dump Euclids and 15 to 20 hired trucks. A good portion of the time, though, the "Eucs" were busy on rock hauls. Eady-Codell salvaged the rock excavation on this work. Later on, the stockpile was worked over and crushed for use.

Heavy Rock Excavation

For chewing out the limestone on this job the contractors used 17 Cleveland wagon drills and 40 Ingersoll-Rand and Cleveland rock drills. These were powered by 17 compressors ranging in size from 125 to 600 cfm. Ten of the units were Ingersoll-Rand 500's. Rock cuts ranged down to 18 feet in depth. Hole spacing varied with the size and depth of the trench. It ran about 2 feet on centers in the smaller trenches and 3 feet for the larger cuts. The bits were Timken; the steel, Bethlehem hex in 2 to 18-foot lengths. Plenty of powder was needed—it ran to more than 400,000 pounds. The contractors used Du Pont 60 per cent special gelatin with millisecond delay caps. Where necessary blasts were covered with mats handled by a Lorain 40. The Lorain 820 backhoe removed all of

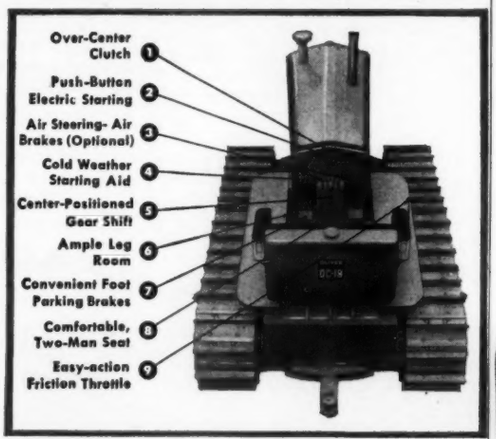
Owners' pride... Operators' delight the NEW OLIVER "OC-18"

OWNERS can't say enough good things about the new Oliver "OC-18." They keep telling us how it does more work . . . how that full 133* drawbar horsepower gives it plenty of power for the really tough jobs . . . about its low operating and maintenance costs . . . and how the operators and mechanics like it.

OPERATORS are even more enthusiastic. It's the first big tractor they've found that is designed to make life easier for them. They tell us that toward the end of a long day on the "OC-18," they are much less fatigued, much more fit to continue giving top performance. The illustration shows clearly the 9 important "easy operating" features of the "OC-18." No other tractor boasts all these. They make the "OC-18" "the operators' dream come true."

Ask your Oliver Industrial Distributor to arrange a demonstration. Or if you prefer, write to The Oliver Corporation, 400 W. Madison St., Chicago, Illinois.

*OFFICIAL NEBRASKA TEST NO. 489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Push-Button Electric Starting 2
Air Steering- Air Brakes (Optional) 3
Cold Weather Starting Aid 4
Center-Positioned Gear Shift 5
Ample Leg Room 6
Convenient Foot Parking Brakes 7
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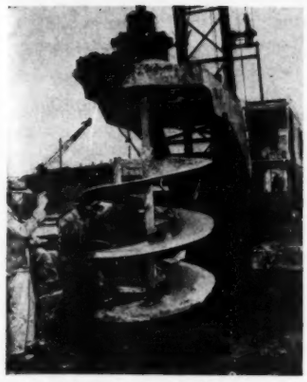


Bell Bottom Foundation Drilling Co. used this auger-type earth drill for the foundation work at the new G-E plant.

the rock excavation.

The Lorain 820 crane, or a smaller Bay City, set most of the pipe. Eye bolts cast in the larger pipe made sling placement easy. Pipe clamps were used for the smaller sections.

Joints for the storm-water sewers were filled with Atlastic 77 bituminous jointing compound, troweled on rather than poured. An Atlas G-K compound went into the sanitary-line joints. The rinse-water line used an acid-resistant poured filler.

All pipe sections rest on a crushed-stone or sand cushion at least 4 inches thick. They were backfilled at the sides and for 1 foot on top with bank-run sand; then the excavated material was dozed back over. On the larger trenches this excavated material was laid back in 8-inch lifts and compacted by sheepsfoot rollers. Le Roi and Ingersoll-Rand air tampers did the compacting on the smaller trenches.

One spot of trenching where a 14 to 15-foot drainage trench crossed a gas main required particular care. The 26-inch main was just below ground surface and carried 700-psi pressure. Crews blasted to within 15 feet of the main and then moved in with two Duncan Roc-Jaks. These units worked nicely, shearing off rock and enabling the crews to take the trench a full 9 feet below the gas main. The main was left in place spanning the trench.

Drilled-In Footings

Excavation for the building foundations began as soon as these areas were brought to grade. Each of the manufacturing units and its office required about 200 footings. The drilled-in caissons varied from 30 to 54 inches in diameter. All were taken to bedrock—1 to 18 feet below the floor levels of the building. Bell Bottom Foundation Drilling Co., Dallas, Texas, had the subcontract and used its own rigs.

One of these rigs was mounted on a Marion, the other on a Bay City. The drilling components hung from the crane boom. A fixed assembly, cantilevered from the crane turntable, secured the drill on line and carried the chain driven out to the kelly bar. An auger-type earth drill of the proper diameter took out the overburden. When the caisson was fully opened, a 2-inch rock drill was shoved down another 12 feet to check the rock structure. (The limestone formation in this area is notorious for its voids and fissures.) If the structure was good, the rig moved on to the next hole. If it wasn't, the earth drill was switched for a rock-core drill. The drillers then took the hole down beyond the void and check-drilled another 12 feet to be sure that there wasn't one void on top of another. In places where the bearing wasn't sufficient, due to fissures, they grouted. The footings were then poured with a 3,000-pound-strength concrete.

Steel Erection

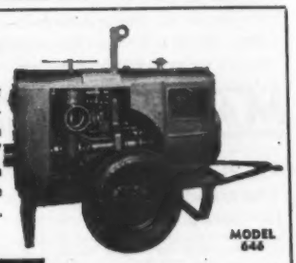
Each of the five manufacturing buildings (three of which are now under construction) is 800 to 1,000 feet long and 600 feet wide. They are one story high and have an inside vertical clearance of 30 to 40 feet. They are of wide-flanged steel-column and truss construction with glass and aluminum siding and brick curtain walls. Six 100-foot main trusses cross each building 20 feet on centers. These frame into 40-foot carrying trusses which run the length of the building. Bays are thus 40 to 100 feet. Outside columns along the sides are 20 feet on centers, however. The buildings will be covered with flat metal decks and built-up roofs. A 2-story 80 x 600-foot reinforced-concrete flat-slab building will abut on the front of each plant to hold offices.

Whitehead & Kales Co., Detroit, Mich., has the subcontract for steel fabrication and erection. Sections are made up in the Detroit plant

(Concluded on next page)

IT'S HERE AT LAST!

A sure way to save money on your next wellpoint job is to get Foundation's new 4" 1000 GPM capacity pump . . . sturdy, compact, for medium and small wellpoint jobs. Why use big 6" and 8" pumping units and pay big fuel bills when you can use this efficient 4" pump, tailor-made for the job? Economical to operate and maintain . . . easy to move around.



MODEL 644

Foundation Equipment CORPORATION
Long Island City 1, N. Y. — 37-35 10th St — EXeter 2-1100
Chicago, Illinois — 2608 W. 111th St — Hilltop 5-1545

4" unit powered by 4-cylinder gas engine

RENTAL — SALES

Write for Literature

DIGGING — Contractor Del Balso of Bronx, N.Y., keeps his Model HM profitably busy. Here it's lowering grade for a new pavement . . . easily cutting the many tree roots encountered.

LOADING — Model HM doing a fast loading job on a dirt pile for Davis Construction Corp., Long Island. Fast reverse speeds and power boosted steering give this "PAYLOADER" high production on loading work.

BACKFILLING — A very popular "PAYLOADER" use is trench work — loading excess dirt and backfilling the trench. Tires do not injure pavements and the bucket can backfill over the top of sheeting or other obstructions.

SPREADING — On the Penn-Lincoln Parkway near Pittsburgh, Frank Mashuda's Model HM spreads shoulder material while concrete pouring goes on beside it. Good tire flotation and maneuverability is an important HM asset here.

MASTER OF MANY JOBS

Big 4 wheel drive "PAYLOADER" tractor-shovels are capable *and* versatile — able to do *many* jobs and drive quickly from one job to another at speeds of 17 m.p.h. Big tires, plus 4-wheel-drive, gives them catlike traction and flotation to surmount poor ground conditions. Power boosted rear wheel steer makes them maneuverable and easy to handle . . . 4 gear ratios in each direction provide the right speeds to fit each task.

The powerful 1½ cu. yd. "PAYLOADER" is the flagship of the "PAYLOADER" fleet, which includes 7 sizes down to 12 cu. ft. bucket capacity. Also a choice of 4 wheel drive, rear wheel drive and front wheel drive to best fit your needs. Your Hough Distributor, one of 200 in the U.S. and Canada, is ready to serve you *right* — with extensive application experience and complete parts and service facilities. The Frank G. Hough Co., 762, Sunnyside Ave., Libertyville, Ill.

WRITE for full information on any of the "PAYLOADER" models: FourWheel Drive HM — 1½ yd. and HR — 1 yd.; Rear Wheel Drive Models HY — 1¼ yd., HF — ¾ yd., HE — ½ yd.; Front wheel drive Models HAH — 15 cu. ft., HA — 12 cu. ft.

SAY "HUFF"

PAYLOADER®

THE FRANK G. HOUGH CO. SINCE 1920

Industrial Center

(Continued from preceding page)

and shipped to the site by both rail and truck.

Cranes for steel erection include two 50-ton Manitowocs, a 25-ton Manitowoc, and a 15-ton Lorain. The Lorain is truck-mounted; the others are on crawlers. The columns —first on the erection schedule—vary in size from 8 WF 24's to 14 WF 176's. Base plates are 26 inches square and 2 ⅛ inches thick. Each is set on a precision-grouted base and held by four 36-inch 1 ⅛-inch round anchor bolts with a 4-inch hook on the bottom. All columns are welded completely around the base with No. 2 Fleetweld rod.

On Building No. 1, erection crews started at one end and worked across the width of the building, completing six of the 40-foot bays at a time. On No. 2, they worked along the full length of the building on one side only while a 480 x 100 x 16-foot hole was dug out on the other side for a huge press pit.

A single crane was able to handle the 40-foot supporting trusses. After a series of these was in place, the 100-foot spans were put up by two of the big rigs. One would have been able to raise the 7½-ton sections but two distributed the load better on the ground and facilitated pinning the end-truss connections to the columns or jack trusses.

Whitehead & Kales kept about eight riveting crews busy on the job. The ¾-inch rivets were 2 to 6 inches long; the 1-inch rivets were 4 to 7½ inches. Spex called for an air pressure of 135 psi on the gun at all times. All the guns were Ingersoll-Rand 9A's powered by two I-R compressors delivering 160 psi at the outlet. The rivets were heated in an air forge, fed at machine-gun pace, and knocked home at the rate of about 2,500 a day by the eight crews. This speed was necessary to keep up with the 500 tons of steel set per week in good weather. Building No. 1 required 4,200 tons of structural steel; No. 2 used about 3,800.

The main trusses are 9 feet 6 inches deep and have a slight peak—8 inches at the apex. Nine-inch I-beam purlins span the 20 feet between trusses. Over these was placed a metal deck and a built-up tar-paper and gravel roof; the decking was welded to the purlins. The Lorain truck crane set side-wall framing steel.

Eady-Codell handled trenching inside the buildings and placement to the railroad-track spurs. They used a Barber-Greene 24-inch trencher to open up cuts for the 50,000 feet of interior plumbing. The railroad tracks run right into the buildings, two or three spurs in each, at a level 3½ feet below floor surface. The outside yards will have about 25,000 feet of track connecting with the Southern and the Louisville & Nashville Railroads.

Placing the Floor Slab

Floors for the manufacturing buildings have a 6-inch concrete base with 2-inch concrete fill and 2-inch wood-block cover. Putting them in was a bit of a problem because of muddy ground conditions. With constant winter rains it was tough to get the areas to dry out. The contractors finally brought in a Traxcavator, cut out about 4 inches of the fill, and laid down a crushed-stone subbase. A half-dozen powered carts placed the concrete. They were fed by transit mixers operating from a 100-yard-per-hour concrete plant on the site. A Bucyrus-Erie Hydro-Crane came in handy on the interior work. It had sufficient capacity for heavy lifting, yet was completely flexible for work in and around the other trades. One of its big jobs was lifting the concrete for eight 40 x 100-foot slabs 35 feet off the floor of the building. These slabs support heavy transformer stations in Building No. 1. The Hydro-Crane carried a 1-yard bottom-dump bucket for this work.

Personnel

The new plant is being constructed for the General Electric Co.'s Major Appliance Division under the supervision of the General Electric Realty Corp., a G-E subsidiary. The Turner-Struck organization is directed by L. C. Macneal, General Manager.

A. H. Brantley was General Superintendent for Codell Construction Co., on the grading and excavation. W. O. Billiter was General Superintendent for Eady-Codell, joint-venturer on the trenching and track installation. W. E. Allen was General Superintendent for Whitehead & Kales, fabricator and erector of the structural steel.

It means so much to them—so little to you. The pint of blood you give may save a life in Korea or in a disaster area at home. Give as often as you can, but remember that March is Red Cross Month.

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All stepped-up models now equipped with automatic centrifugal clutch.

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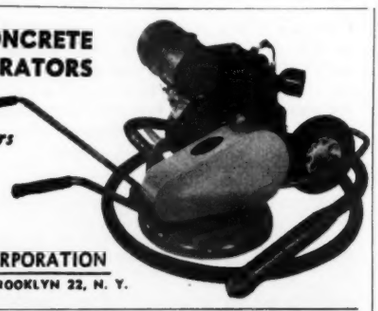

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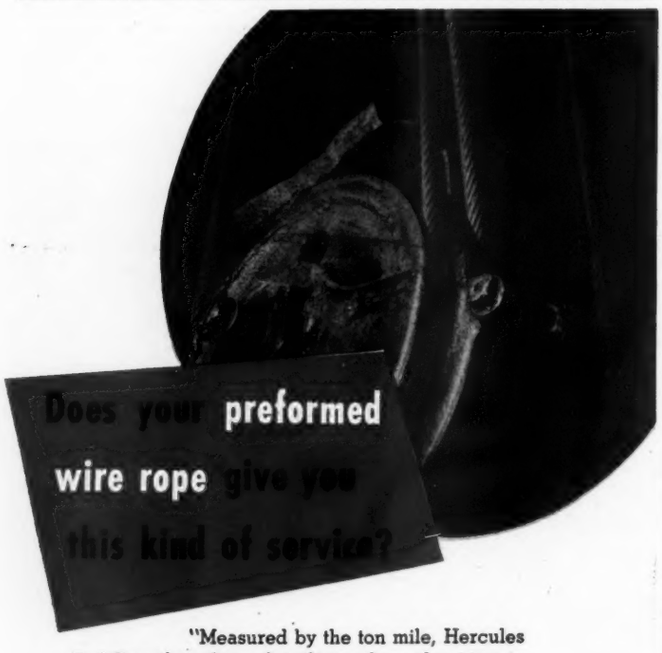

"Measured by the ton mile, Hercules Red-Strand preformed outlasts others about two to one," reports one operations manager. Another operator testifies, "Our records show Red-Strand is considerably out in front of four other ropes."

Why HERCULES Red-Strand excels

What's the reason for such performance and praise? In simple terms, it's because *higher-than-rated quality* in Red-Strand preformed delivers *longer-than-expected service.*

If you're not completely satisfied with *your* wire rope service, try Red-Strand preformed. You'll experience the difference too.

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HIGHER-THAN-RATED QUALITY

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... the new separable

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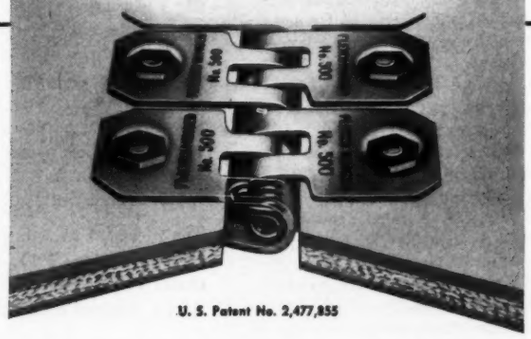

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- For belts ⅜" to ½" thick.
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FLEXIBLE STEEL LACING CO. 4704 Lexington St., Chicago 44, Ill.

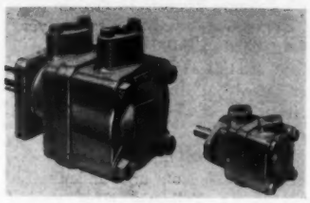
Oil Hydraulic Motors

A new line of oil hydraulic vane motors utilizing heat-treated alloy steel for shaft, rotor, and vanes is announced by Vickers Inc., 1492 Oakman Blvd., Detroit 32, Mich.

The rocking-beam construction keeps all vanes in intimate contact with the cam ring at all times, yet is not subject to the fatigue-failure difficulties of spring-type vane actuators, the company claims.

Mounting adaptability is provided by a choice of four combinations of inlet and outlet port positions, and choice of flange or foot mounting and either direct, belt, chain, or gear drive. The motors are available in two series, M2-200 and M2-500, for 5, 6.5, and 26-hp output.

Further information may be secured from the company by requesting Bulletin No. M-5102. Or use the Request Card at page 18. Circle No. 363.



Bulletin on 4-Wheel Drive

A bulletin on a 4-wheel drive with a 2-speed range for Chevrolet trucks is available from The Northwestern Auto Parts Co., 834 N. 7th St., Minneapolis 11, Minn.

The Powr-Pak consists of a driving front-axle full-floating hypoid with a 6.17:1 ratio. The transfer case provides 8 forward and 2 reverse-speed ratios. The unit also includes propeller shaft-couplings between the transmission and transfer case and between the transfer case and the front axle.

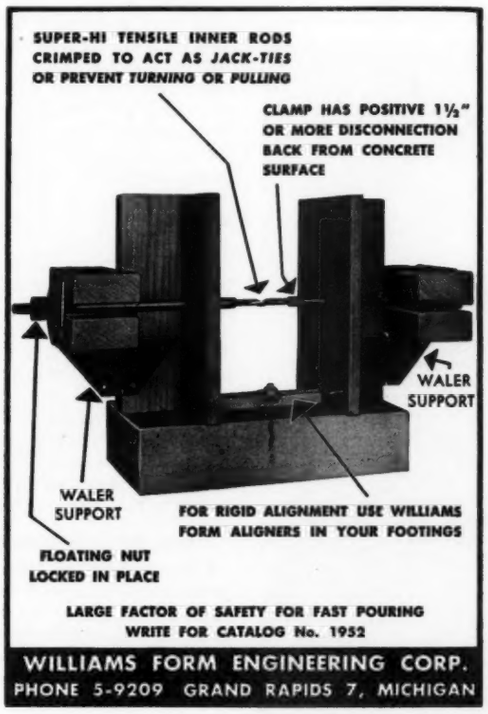
A separate lever allows fingertip control to engage or disengage front-wheel drive. Transfer ratios when transmisson is in high gear are 1:1 in high and 1.94:1 in low range.

This literature may be obtained from the company, or by using the Request Card at page 18. Circle No. 364.

Prestressed-Concrete Firm

A new prestressed-concrete firm has been established—Prestressing, Inc., located in San Antonio, Texas. James J. Mennis, as Vice President and General Manager, and Fred E. Koebel, as Chief Engineer, form the active management.

The purposes of the company are to make available techniques and uses of prestressed concrete through licensees selected from established firms such as manufacturers of masonry modular units and precast-concrete products, as well as contractors specializing in concrete construction. Among the services provided are design and manufacture of equipment necessary to engage in prestressed-concrete construction; provision of technical and engineering services; a continuing program of research and development; and design and manufacture of all necessary hardware for end anchorages required by PI methods. This equipment has been designed for upsetting high-carbon wire with duplex heads so that in post-tensioning operations the end upset is used to attach pulling devices and the intermediate upset is used to provide positive anchorage of the wire.

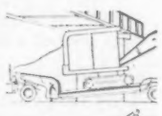

SUPER-HI TENSILE INNER RODS CRIMPED TO ACT AS JACK-TIES OR PREVENT TURNING OR PULLING
CLAMP HAS POSITIVE 1½" OR MORE DISCONNECTION BACK FROM CONCRETE SURFACE
WALER SUPPORT
WALER SUPPORT
FOR RIGID ALIGNMENT USE WILLIAMS FORM ALIGNERS IN YOUR FOOTINGS
FLOATING NUT LOCKED IN PLACE
LARGE FACTOR OF SAFETY FOR FAST POURING
WRITE FOR CATALOG No. 1952
WILLIAMS FORM ENGINEERING CORP.
PHONE 5-9209 GRAND RAPIDS 7, MICHIGAN

LOW LOADING permits an easier, faster, more profitable operation in hauling equipment to and from the job.

Shovel "walks" up low deck over a minimum of blocking and rampage. *There is no stress or strain applied to the frame or gooseneck.* No blocking required under frame.

For your best buy in a multi-purpose, heavy duty trailer, investigate this versatile unit. It incorporates every desirable "job-proved" feature originated by Rogers.

CAPACITIES: 15, 20, 25, 30, 35, 40, 50, 60 & 75 TONS
DETACHES, LOADS AND ATTACHES IN 5 MINUTES —
LOADS EASILY OVER LOW FRONT OF DECK —
RAISES ITS DECK TO CLEAR HIGH BANKED CROSSINGS —
STOOPS TO CLEAR LOW OVERHEAD OBSTRUCTIONS —
20" & 24" TIRES INSURE GREATER TIRE LIFE, LARGER AND MORE EFFECTIVE BRAKES: AND OFTEN PERMIT INTERCHANGEABILITY WITH TRACTOR TIRES.



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Also of timely interest is this ROGERS Tag-A-Long trailer which makes a dump truck serve as a tractor and effects sizable savings for contractors.

Dependable Equipment for the Construction Industry

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Road-Building Speedup Urged as AASHO Meets

Emergency Status Normal, Tallamy Declares; Pleads for Immediate Buildup of Interstate System

• IMMEDIATE acceleration of American road-building programs at every level, particularly on the interstate highway system, is needed. And unless the work speeds up at once, regardless of foreign crises and the world situation in general, America's transportation system may be on its way to ruin.

It was this theme which dominated the 38th Annual Meeting of the American Association of State Highway Officials as 900 engineer-members of the organization met in Kansas City, Mo., December 10 to 12. From many points of view the various aspects of the problem were brought into focus as prominent highway engineers from all parts of the nation spoke on policies, engineering, design, construction, maintenance, public relations, and other subjects allied with highway construction.

Tallamy Reports to Group

The passage by Congress this year of a record $575,000,000 Federal-Aid highway bill is the brightest hope for road building since the mid-thirties' depression. But this hope is somewhat more than tempered by conditions which make modern highway work so slow and difficult. So said B. D. Tallamy, New York's State Director of Public Works, in his President's annual report at the opening session of the meeting.

After a decade in which the nation has been either at war or on the brink of war, Tallamy said, "we are compelled to consider emergency times as normal". Future highway programs must be geared to the prospect of recurring shortages of manpower and materials, he said, yet a growing public realization of the need for good roads holds the promise of progress.

Tallamy pointed out that a key part of the record Federal appropriation was the $25,000,000 especially earmarked for work on the interstate highway system. "Do you realize that this system, which is the very backbone of your national network of highways and upon which most of our interstate commerce utterly depends, is in vital need of construction?" Tallamy asked. He pointed out that of the total of 37,800 miles of such roads, only 2,800 miles are in satisfactory condition. Reconstruction of 26,000 miles is urgently needed, as is widening and surfacing on 9,000 miles.

"Just Too Many Patches"

"The old roads, built in the road-production period of the twenties, have been patched up, patched up again, and continued in service long beyond their reasonable life", Tallamy asserted. "It is hard to get the traveling public to realize that. They know that beauty is only skin deep, but, on the other hand, they look only at the skin of the pavement. The very road they think is reasonably good because of its surface appearance may fail overnight. We lose ground each year to the deadly attrition of obsolescence, the spectacular growth of traffic, and increased highway - construction costs", he explained.

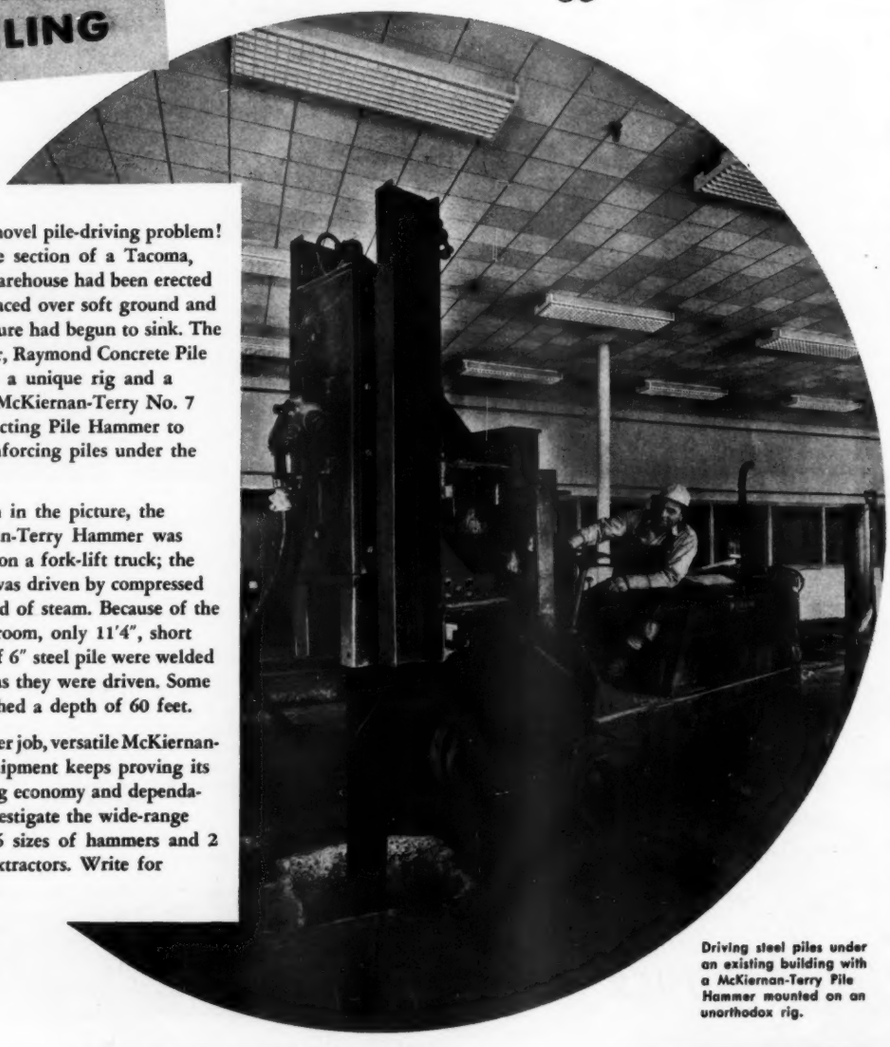
In relation to its collection of $2 billion per year in gasoline taxes, the Federal government is not paying its fair share of highway costs, Tallamy said, and yet the most desirable solution would be to eliminate Federal collections and leave revenue raising to the states. In fact, the AASHO President added, the U. S. gas tax should be abandoned as such, and those funds should be left to the several states.

Better Public Relations Urged

Public support of highway programs is developing as state highway departments tell people the facts, speakers at committee panel meetings told delegates interested in the subject of public relations. In fact, the increasing importance of public

HOW TO DRIVE PILING

Inside an Office!



Here's a novel pile-driving problem! The office section of a Tacoma, Wash., warehouse had been erected on fill placed over soft ground and the structure had begun to sink. The contractor, Raymond Concrete Pile Co., used a unique rig and a versatile McKiernan-Terry No. 7 Double-Acting Pile Hammer to drive reinforcing piles under the building.

As shown in the picture, the McKiernan-Terry Hammer was mounted on a fork-lift truck; the hammer was driven by compressed air, instead of steam. Because of the low headroom, only 11'4", short sections of 6" steel pile were welded together as they were driven. Some piles reached a depth of 60 feet.

On job after job, versatile McKiernan-Terry equipment keeps proving its piledriving economy and dependability. Investigate the wide-range line of 16 sizes of hammers and 2 sizes of extractors. Write for bulletin.

Driving steel piles under an existing building with a McKiernan-Terry Pile Hammer mounted on an unorthodox rig.

OTHER McKIERNAN-TERRY PRODUCTS

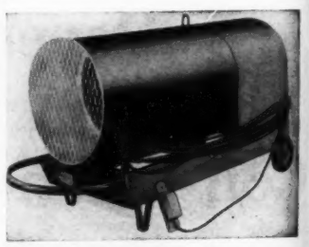
MEAD-MORRISON COAL AND ORE UNLOADERS AND BRIDGES
Available in a variety of designs and in capacities of 300 to 1500 tons per hour. Exceptional durability proven by installations in service for half a century. Simple controls afford convenient, comfortable and speedy operation.

GRAB BUCKETS
Range of types and sizes take bulk materials loads up to 25 tons. Ruggedness without excess weight.

HONING UP TO 42-IN. I.D. X 55-FT. LONG
Typical of the extensive facilities of McKiernan-Terry for unusual jobs.

McKIERNAN TERRY

McKIERNAN-TERRY CORPORATION • MANUFACTURING ENGINEERS • 19 PARK ROW, NEW YORK 38, N. Y.
Plants: Harrison, N. J. and Dover, N. J.
MK 323



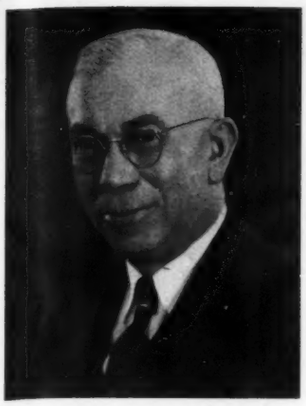
NEW "ECO-TEMP" SUPER AIR HEATER

PORTABLE OIL-FIRED UNIT

Delivers 375,000 BTU's on 2.75 gallons of No. 2 fuel oil per hour. Perfect combustion—no soot, no smoke, no odor. Instant heat—240°F. temperature rise. Easily moved on semi-pneumatic rubber tired ball bearing wheels. Oil is drawn through hose direct from separate drum or storage tank. Uses 110 volts, 60 cycles, single phase. Strong, durable steel construction. 35" high, 64" long, 24" wide. Weighs 325 lbs.

Write for Literature and Prices

Arthur C. Baumann
7017 Grays Avenue • Phila. 42, Pa.



Charles M. Ziegler, new AASHO President.

relations in highway engineering was reflected in the much more than usually prominent position of the subject on the AASHO program.

In general, speakers were inclined to take a dim view of the usual connotations surrounding publicity, public relations, or propaganda. H. L. Plummer, Chairman of the Wisconsin Highway Commission, said that such programs should rather emphasize the "information and education" angle.

Many examples were cited to show that better public relations pay off in terms of taxpayer support and public appreciation of a highway department's program. Typical of such examples was one told by Virg Hill, Director of Public Relations of the Kansas State Highway Commission.

Hill told how the first 1952 winter snowstorm howled down on the state prematurely, blanketing the highway system and choking even the north-south roads—an unusually severe state of affairs. Traffic was blocked in many places. To offset possible unfavorable public reaction, the Public Relations Office drafted a citation of merit after about 24 hours. It was signed by the State Highway Engineer. It praised each and every maintenance man in the Department who had worked straight through the emergency, and cited numerous acts of heroism. The citation was released to all Kansas newspapers in time to turn possible editorial criticism into almost universal editorial support, and the resulting reaction shows in a new appreciation and awareness on the part of Kansas people of their highway department.

A strong plea for wider use of factual data as the basis for sound highway development was voiced by Mr. Highway himself—Commissioner of Public Roads Thomas H. MacDonald. Commissioner MacDonald said that an informed public opinion is essential to progress, and urged that continuing studies be conducted so that all facts regarding the highway program are available for public analysis and understanding.

"The most important single duty we have as responsible highway officials is to supply our lawmakers with full data from continuous engineering and economic surveys," MacDonald said.

New Legislation Promised

A promise of new legislation to relieve some of the present dangerous highway congestion was held forth by John J. Dempsey, of New Mexico, Member of the U. S. House Subcommittee on Roads. Dempsey told delegates that he plans to introduce a House bill in the next session of Congress earmarking at least $200,000,000 for new construction on the interstate highway system—this sum additional to the routine $550,000,000 Federal-Aid appropriation for highway work.

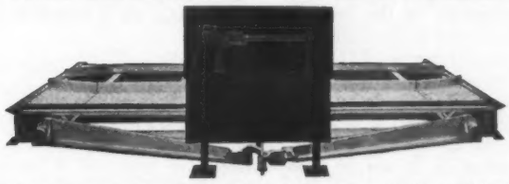
Congressman Dempsey lashed out hard at high-speed driving, deplored the lack of coordination in maximum speed limits, and ridiculed the lack of common sense of many automobile drivers who, he said, "put no curbs on suicide." Last year's 680 billion vehicle miles of automotive operation resulted in 37,500 deaths, Dempsey reminded his listeners, and in the last 5 years there has been a 200 per cent increase in the amount of insurance paid by automobile owners.

Maintenance

The impact of the Machine Age on highway maintenance was graphically described by D. N. Stewart, Engineer of Maintenance for the

(Concluded on next page)

WINSLOW—PORTABLE TRUCK SCALE
"THE CONTRACTORS' SPECIAL SCALE"



For use at temporary and permanent locations—at stock piles and by bituminous material contractors at the job site. Capacities: 15-18-20-30 tons.

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in WIRE ROPE, too, specialized use calls for the RIGHT KIND of muscle

Tough, wiry muscles stand the Rocky Mountain Bighorn in good stead; give him the sure-footed agility he must have to survive on almost impassable heights.

In wire rope, too, the right kind of muscle is mighty important . . . because different uses present different problems of wear and tear. Bending fatigue. Abrasion. Shock stress. Load strain. Each requires wire rope with the right construction and lay; the right grade of steel and size of wire to best withstand the destructive forces encountered.

Complete quality control from ore to finished rope; long experience and specialized know-how—these are your assurance that in Wickwire Rope you always get the proper combination of physical properties for long-lasting, reliable service on your particular job.

See your Wickwire Rope distributor or contact our nearest sales office.

A YELLOW TRIANGLE ON THE REEL IDENTIFIES WICKWIRE ROPE

THE COLORADO FUEL AND IRON CORPORATION — Abilene (Tex.) • Denver • Houston • Odessa (Tex.) Phoenix • Salt Lake City • Tulsa

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WICKWIRE ROPE

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0516

Road-Building Speedup Urged as AASHO Meets

(Continued from preceding page)

Colorado State Highway Department.

"Probably one machine which has done more than anything else for road maintenance in the past 20 years is the motor grader," Stewart said. "The motor grader of 15 years ago could be used for surface blading and that was all. Today with tandem drive, all-wheel drive, leaning wheels and all the various moldboard attachments, it can be used for ditching, backsloping, shoulder sloping, shoulder maintenance, road-mixing, and many other maintenance operations.

Stewart also singled out for praise the eminently satisfactory loaders now on the market, saying "they have conserved more manpower than any other single machine." The use of motor graders and loaders as a team in ditch cleanup, snow removal, slide control, and so on was extolled by the venerable veteran of maintenance from the Rockies. Almost any phase of maintenance can now be mechanized, he said.

Construction, bridge, design, and other committee agendas were similarly crowded with routine problems for discussion. At a construction session, for example, Chairman C. M. Hathaway of Illinois pointed up the need for better on-the-job training programs for both new and old-time inspectors, to make sure that the many high-cost items in a modern highway are put in properly. Hathaway also suggested that the time has come to use engineers only in key engineering places, and to farm out nonprofessional work to nonprofessional personnel who are qualified to handle it.

Resolutions Drafted

Several resolutions adopted at the Association's meeting were designed to untangle the highway mess. One resolution endorsed a study now being made by the U. S. Department of Commerce on the overall impact of water-resource development on highway transportation. Another called for exemption of right-of-way purchases from Internal Revenue stamps. A revision of Federal Power Commission rules was asked, so that hydroelectric power sites could not be held undeveloped, indefinitely, to the detriment of highway locations in those areas.

One resolution endorsed Senate Bill 3149, introduced in the 82nd Congress, authorizing Federal repayment to states for roads inundated by dam-building activities of Federal agencies. The last resolution emphasized the critical status of America's highway system by calling for an increase in Federal aid to the full amount presently collected by the Government in gasoline taxes.

The ever-rising cost of living has even resulted in an alarming decline in the net worth of the AASHO's financial structure, delegates were told at a business meeting. These factors, together with a decline in revenue from the sale of the AASHO's official publication, makes necessary an early ballot by letter calling for increased dues to operate the organization in coming years.

New Officers Elected

Succeeding Tallamy as AASHO President will be C. M. Ziegler, head of the Michigan Highway Department. Elected as First Vice President was A. E. Johnson of Arkansas, who heads that state's highway activities.

Regional Vice Presidents include G. A. Hill of Connecticut, Region 1; D. H. Bray of Kentucky, Region 2; Rex M. Whitton of Missouri, Region 3; and George T. McCoy of California, Region 4.

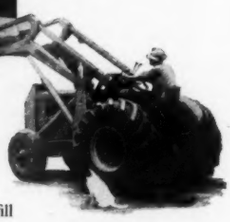
Safety Work Gloves

New work gloves, made with closed flexible metal zippers permanently bonded to fingers and palms in synthetic rubber, are available from the Surety Rubber Co., of Carrollton, Ohio. They are said to provide positive gripping action, long wear, and a maximum degree of pliability.

The new line of Armor Grip gloves, mittens, and palm guards safeguards against impact, cutting, and abrasive wear, the company says. The gloves are manufactured in all sizes and styles for jobs requiring maximum protection for palms and fingers.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 365.

No run-around with REESE!
(it has the reach)



YOU LOAD FROM ANY ONE SIDE

SPOT YOUR TRUCKS where it suits you best. Then fill them completely from any *one* side with the Reese Loader. Its extra reach and high lift let you dump into every corner from *one* side. There's no half-filling, then jockeying around to finish the job. Reese is faster, too, because there's a handy shuttle gear lever on the tractor for those quick back-and-forth trips. You can reverse instantly in any of its six speeds.

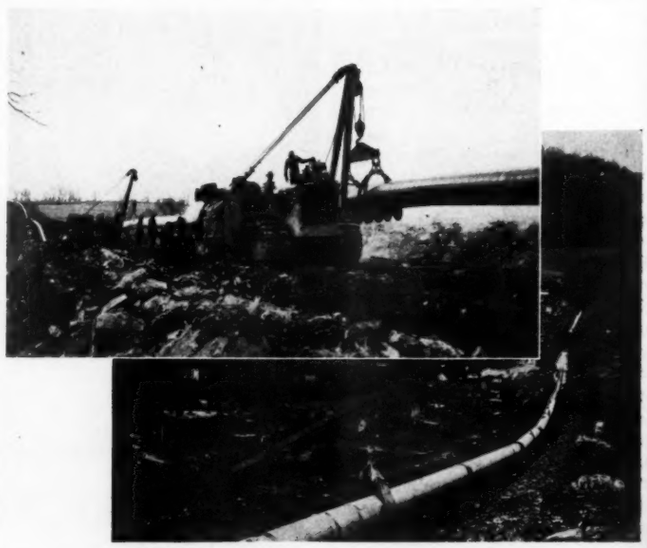
Reese Hydraulic Loaders are built in two sizes for Minneapolis-Moline UTIL and RTI Tractors. See your local dealer or write for catalog.

REESE ENGINEERING CO., 9517 Rush St., El Monte, Calif.

HIGH LIFT—More than 10-foot clearance under bucket permits loading of the highest trucks with a Reese Hydraulic Loader.

VARIETY OF USES—The Reese Loader is adaptable to a variety of jobs. The fork lift, jib boom and back-fill blade are also available. Each can be installed in less than fifteen minutes.

REESE Hydraulic Loaders



TAKES REAL MUSCLE . . . .
. . . plus muscle control

Putting to bed this 30" heavy wall gas pipeline is no pipe dream! The general superintendent described this Ohio and Kentucky terrain as "the toughest section along the Ohio River".

Superior side booms, 20' long, mounted on International TD-24's, perform an indispensable part in gently yet powerfully putting this huge pipe into place. Clear visibility, sensitive and positive controls are key factors in this fine performance.

Other Superior Equipment: Revolving cranes, Blade Backfillers, Pipe Tongs, Pipe Dollies, Heavy Duty Blocks.

Superior EQUIPMENT CO.
BUCYRUS, OHIO

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COMPARE!

STERLING
Hydraulic Control
EARTH BORING
MACHINE

DIGS HOLES
SETS POLES

EASIER!
FASTER!
CHEAPER!

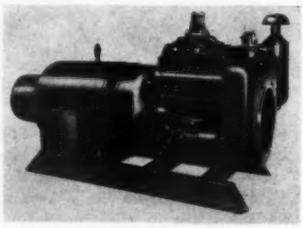
Under hard digging conditions "STERLING" has proven itself worthy of its name. Maintenance costs are at a minimum and Swing Mount, Turn Table, & Fore and Aft hydraulically controlled mountings save time in locating stakes. Augur sizes from 10" to 26" are standard and depths to 7½ ft., 9½ ft. and 14½ ft. are available . . . . . Dig your holes the hydraulic way--Ask any Sterling owner -- Ask for a demonstration.

WYOMING VALLEY EQUIPMENT COMPANY

1089 WYOMING AVENUE
FORTY FORT (Wilkes-Barre), PA.
Phone Kingston 7-6400

Generating Plant

An electric-generating plant for emergency stand-by service, is announced by the Universal Motor Co., 428 Universal Drive, Oshkosh, Wis. It has a 10-kw capacity, for a wide range of applications. It is available with electric starting or can be supplied with controls which automatically start the plant the instant regular power fails, the company claims.



The unit features a 4-cylinder air-cooled gasoline engine. The plant's maintenance needs are said to be reduced to a minimum, there being no water-cooling system. The plant can be furnished for single or 3-phase service, at either standard or special voltages.

Further details may be secured from the company. Or use the Request Card at page 18. Circle No. 263.

Data on Welded Pipe

A catalog on welded steel pipe has been released by Southern Pipe & Casing Co., P. O. Box C, Azusa, Calif. Information is given on specifications, prices and weights. There are also pictorial descriptions of fittings, field joints, protective coatings and types of pipe, from 4 to 36 inches in diameter.

Steps in pipe making are outlined and the latest procedures in the application of protective coatings are discussed.

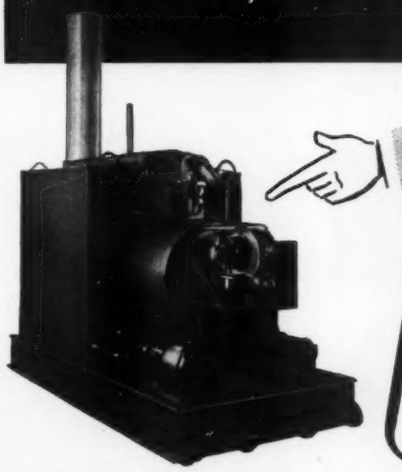
This literature may be obtained from the company, or by using the Request Card at page 18. Circle No. 310.

Euclid Engineer Promotions

H. L. Rittenhouse has been appointed to the newly created post of Manager, Product Development & Engineering, for The Euclid Road Machinery Co., Cleveland, Ohio. Formerly Chief Engineer, Mr. Rittenhouse will direct all engineering including that of the Experimental Department and the field-testing program.

Carl Koenig, formerly Assistant Chief Engineer, has been promoted to Chief Development Engineer, and Louis Held to Chief Product Engineer. Elmer Kemp is the new Staff Engineer in charge of components and cost control; Ray Vincent is Engineering Office Supervisor.

HO Hot Oil Heaters
for
LO Pressure Heating
NO Freeze, Rust or Pressure Problems



Here's the most efficient hot oil heating system available today! Hopkins developed this low-pressure heater for asphalts, chemicals, heavy oils, plastics, waxes, and many other materials. It's completely automatic, easy to operate, and gives you accurate, uniform heat control 24 hours a day. Ends all freeze, rust and pressure problems—lessens maintenance worries.

If your industrial heating process requires a temperature between 212° F. and 400° F., the HO System is your best bet for dependable, low-cost heating. Write or phone us today for literature and complete details.

HOPKINS VOLCANIC SPECIALTIES, INC.
ALLIANCE, OHIO

Twin Spreader Model "T"
Sand Spreader for Seal Control and Ice Control

Check these features:
1. Variable speeds of individual discs.
2. Two spinners.
3. Large double hopper.
4. Low dumping height —23 inches.

Write for Bulletin N, also for Bulletin N-1 describing Model "H" Hydro Spreader, the all-purpose spreader for ice control, seal coating and lime spreading.

Central Engineering Co., Inc.
4429 West State St. Milwaukee, Wis.

Give To Conquer Cancer

THURMAN Heavy Duty
PIT SCALE

Platforms:
18 to 50 Feet
Capacities:
20 to 50 Ton

Built to rigid U. S. Bureau of Standards specifications. Pivots and bearings of fine heat-treated steel, electroplated to resist corrosion. Castings and forgings are oversize for safety. I-beams and cross members are extra heavy structural steel. Pit preparation blue prints are furnished.

The Thurman Portable Truck Scale. The scale that can be moved from job to job as a unit and requires no pit! Made in 20, 25, and 30-ton capacity. Platform length: 18, 22, 24, and 30 ft.

The Thurman Line Includes:
- Portable Motor Truck Scales
- Batching Scales
- Pitless Scales
- Liquid Weighing Scales
- Wheelbarrow Scales
- Warehouse Scales
- This and other weighing equipment in sizes to fill your requirements.

THURMAN MACHINE CO.
SCALE DIVISION
Established 1918
156 North Fifth Street Columbus 15, Ohio

Nelson Field Engineer

Nelson Stud Welding, Division of Gregory Industries, Inc., Lorain, Ohio, has appointed Alex Oleair as Field Engineer in charge of a new office opened at 710 W. 21st St., Norfolk, Va. Mr. Oleair has been Manager of Customer Service for the transportation industries for the past year. The Virginia office will service construction firms using stud welding throughout Virginia and North Carolina.

Versatile Chain Saw

A new 5-hp combination gasoline engine and chain saw is announced by Mall Tool Co., 7725 S. Chicago Ave., Chicago 19, Ill. Attachments convert the 2MG chain saw to: (1)

earth auger for digging post and pole holes, boring grease traps and drainage sink beds; (2) wood drill, using ¼ to ¾-inch chucks for boring holes for all types of construction; (3) concrete vibrator for fast complete compaction; (4) concrete surfacer for smoothing hardened concrete, removing form marks and irregularities; and (5) sump pump for draining trenches, excavations, caissons, tunnels, sewers, and rain-swamped areas. It pumps around 5,000 gallons an hour.

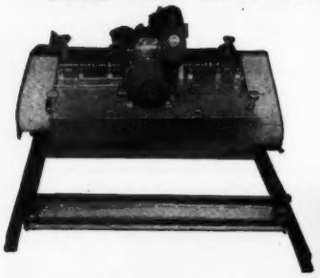
Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 285.

Export Manager for Pioneer

J. Miller Brown has been appointed Export Manager for Pioneer Engineering Works, Inc., Minneapolis, Minn., manufacturer of belt conveyors, feeders, crushers, and storage bins. He has been Sales Engineer for the company in the southwestern states since 1946. Last September, Mr. Brown, in his new capacity, began a tour of Mexico and other Latin American countries.

PAVE SIDEWALKS

Faster, Easier with DOTMAR CURB and GUTTER PAVER!



Only 5 to 10 Minutes for Walk Fronting a 50 Ft. Lot --UP to 72in. Wide

Contractors, Municipalities, testify DOTMAR pays for itself in first mile of curb and gutter paved; proportionately in paving walks, highway widening strips and highway dividing curb. No face forms to set in curb work. Hundreds in use. Send for Dotmar Paver Bulletin 52.

Dotmar INDUSTRIES Inc.

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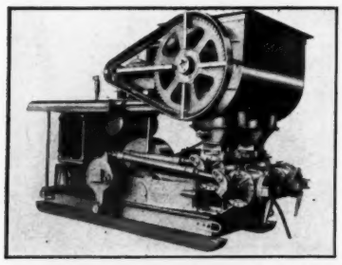
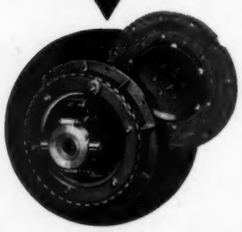




Concrete in One Operation

Chain Belt Company's REX PUMPCRETE pumps concrete by pipeline, from the mixer to the forms—eliminating trestling, scaffolding, towers, buggy runs, cranes, conveyors and trucks. ROCKFORD CLUTCHES provide power transmission control for the pugmill remixing hopper on this heavy-duty unit. Let ROCKFORD clutch engineers assist your product designers plan rugged, efficient power controls for *your* machines.

B-W ENGINEERING MAKES IT WORK

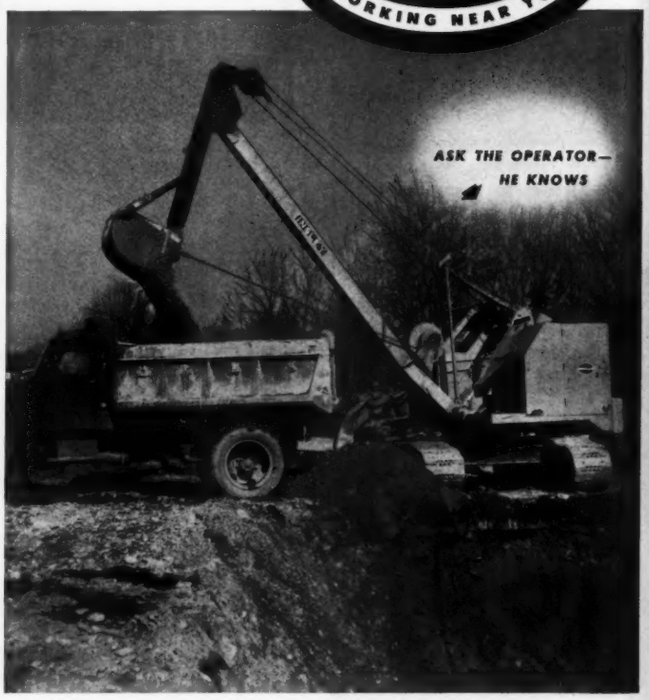
B-W PRODUCTION MAKES IT AVAILABLE

ENGINEERING BULLETIN SENT ON REQUEST

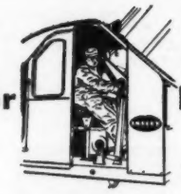
ROCKFORD CLUTCH DIVISION BORG-WARNER
314 Catharine Street, Rockford, Illinois, U.S.A.

ROCKFORD CLUTCHES

THERE'S AN INSLEY WORKING NEAR YOU



The INSLEY operator



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that Insley Equipment can be rated-for-the-project . . . he knows that specification alternates make it possible to buy the exact equipment to do his job best.

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Liquid Ballast Tires Give Greater Traction

Puncture Resistance, Use of Anti-Freeze Solution Make Filling Suitable for Construction Equipment

By R. W. SOHL, Manager, Tractor & Implement Tire Development, Goodyear Tire & Rubber Co.

• THE use of liquid ballast in tires dates back to the early days of pneumatic tires on farm tractors. When rubber tires replaced steel wheels on tractors, considerable weight was lost, and since the amount a tractor can pull is directly proportionate to the weight on the traction wheels, some means of restoring this weight was necessary for satisfactory performance.

At first, cast-iron or cast-concrete weights bolted to the wheels were used, but in 1936 Goodyear recommended the use of water-filling for increase in weight.

Anti-Freeze Solution

Since most farming areas experience freezing temperatures, some anti-freeze protection was necessary. After considerable investigation and testing, the most suitable material was found to be calcium chloride. The reasons for this are as follows: (a) low cost; (b) widespread availability; (c) it is not injurious to rubber or valve steam; and (d) it produces a heavier weight solution than plain water.

A solution of 3½ pounds of 77 to 80 commercial flake calcium per gallon of water gives satisfactory protection down to minus 30 degrees F, and has a specific gravity reading of 1.218 at 60 degrees F, which can be checked with an ordinary storage battery hydrometer.

This solution should be prepared by pouring the calcium chloride into the water—never the reverse—and stirring and agitating. As considerable heat is generated in this mixing process, the solution should be allowed to cool to room temperature before use.

The published tables on calcium chloride solution show that a 23 per cent solution (3½ pounds per gallon of water) has a freezing point of minus 11.9 degrees F. This is the point at which freezing starts, but there is a "slush" zone between this point and minus 52 degrees F at which solidification occurs, and no damage will be sustained during this "slush" period. The tire bursts only

(Continued on next page)

20 Second START
FOR STUBBORN DIESELS with
STAVIS STARTING FLUID
Pour or spray into air intake. Sure, quick starts. Save batteries. Save time. Save money.
Used by diesel operators everywhere. Some distributor territories still open.
Write for details today.
$30. PER CASE SHIPPED PREPAID
STA-VIS OIL COMPANY 202 EAGLE ST., ST. PAUL 2, MINN.

ARNOLD LUBRICATOR
AUTOMATICALLY OILS AIR TOOLS
ARNOLD LUBRICATOR
PATENTED
Thus cuts maintenance costs, reduces downtime, prolongs tool life
Oil flow from Arnold Lubricator starts when air tool starts, stops when tool stops, automatically lubricates all working parts. Oil flow easily adjusted to tool needs. Can be filled under line pressure; window tells you when.
Light weight. Easily installed in hose line or on bench. Streamlined to prevent catching. No moving parts to get out of order. 4 sizes. Order from your equipment dealer TODAY, or write us for leaflet and prices.
Dealer inquiries invited.
THE RUCKER COMPANY
4228 HOLLIS STREET • OAKLAND 8, CALIFORNIA
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WAUKESHA
Diesels
6-WAKD WAUKESHA
Super Duty DIESEL
6-cyl., 6¼-in. bore x 6½-in. stroke, 1197 cu. in. displacement.
The patented combustion spherical combustion chamber gives lively, responsive acceleration, shock-free operation, and clean burning for high fuel economy. Get Bulletin 1415.
WAUKESHA MOTOR COMPANY
Waukesha, Wisconsin
NEW YORK
TULSA
LOS ANGELES
199

The 1952 Edition of
CONTRACTORS AND ENGINEERS'
"Where To Purchase Guide"
is available.

If you wish a copy of this pocket-size booklet of names and addresses of manufacturers and suppliers of hundreds of construction products, circle No. 370 on the reply card to be found in this issue facing page 18 and mail card to

CONTRACTORS AND ENGINEERS
470 Fourth Avenue, New York 16, N. Y.

Liquid Ballast Tires

(Continued from preceding page)

where the solution freezes solid.

As the amount of calcium chloride is increased, the solution becomes more critical, and densities above 29.6 per cent (5.1 pounds per gallon) have decreasing anti-freeze values, with the excess calcium chloride settling out as solid lumps which may cause tire failure. Thus solutions with excessive amounts of calcium chloride are not only unnecessary but may actually be harmful.

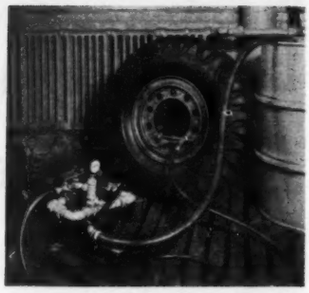
Method and Equipment

Since 1944 Goodyear has recommended filling tires 100 per cent with solution, and has developed and patented both the method and the equipment for doing this job.

The equipment consists of suitable pumps, control valve, hose lines, and valve connections, so that either suction or pressure can be produced. Also, by means of a combination vacuum and pressure gage mounted on the pump, the condition within the tube may be checked at any stage of the operation without stopping the pump. The pumps are available for operation by hand, electric motor, or gasoline engine, so that this job can be done anywhere.

The advantages of 100 per cent solution filling are:

(1) Pressure is maintained, as there is no diffusion loss through the tube wall such as occurs with air inflation or partial solution filling.



A tire should be filled 100 per cent with water or solution, Goodyear recommends. The pump in use here is a Winona 347 liquid-tire pump.

(2) If overloads occur because of weight transfer when operating on sloping ground or under similar conditions, the pressure in the tire automatically increases to keep the tire deflection practically constant.

(3) The 100 per cent filling supplies maximum weight, which gives maximum traction and consequently reduced slip and improved treadwear.

(4) Bouncing is reduced on rough ground or on "washboard" roads.

These advantages are not obtained with less than 100 per cent filling.

This 100 per cent filling in tires is recommended for slow-speed traction-type machines such as tractors, road graders and maintainers and wheel-type bulldozers where the primary function is traction. It is not recommended for high speed (over 20 mph) nor for load-carrying vehicles except underground mine cars.

Filling With Water

During the past two years, tires used on underground mining equipment have been filled 100 per cent with water (since freezing temperatures are not encountered here) with a good deal of success. This has eliminated the frequent service necessary in reinflating tires when air is used. Air-filled tires require either that a compressor be taken below ground or the equipment brought to the surface, both of which are inconvenient and expensive. Filling with water also eliminates the hazard of explosions which might be set off by an air-inflated tire blowing out.

Valve stems for use with solution filling should be of the crimped-base type to prevent separation between the valve stem and tube. All tractor tubes and grader tubes for drop-center rims and spud-type valves now have this type of construction.

Pressure Readings

In all solution filling, the weight of the solution is considered a part of the load on the tire, and pressure readings should always be taken with the valve at the lowest position to compensate for the pressure effect or head of liquid in the tire. Special gages are available by the tire-gage manufacturers which are suitable for use with water or calcium-chloride solutions. These gages can also be used to read air-inflation pressures. Working pressures should be established with the tire under normal load.

Texas Highway Operation

Following are comments from a

DIG CAISSON PIER HOLES

WITH BELLED FOOTINGS

CALWELD EARTH DRILL, Model 150 A, drills 16 to 84 inch holes to a depth of 200 feet. Removes 21.5 cubic feet per pass. Eliminates costly hand labor and danger of men having to work underground. Saves up to 40% over old methods of digging pier holes.

Every operation of the Calweld Earth Drill, Model 150 A, is mechanically performed. Interchangeable buckets allow boring in every soil condition. All controls are centered in a single unit for simple operation. Built on a skid frame for easy mounting on any truck two ton or larger.

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4 HP • 5 HP • 7 HP

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GLADDEN OPENS KANSAS CITY SALES AND SERVICE PLANT
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This new Kansas City outlet means faster delivery and quicker service. This is another step in Gladden's network of distributors throughout the world to offer you the finest in sales and service on Gladden engines.

REMEMBER, BUY POWER PLUS ... BUY GLADDEN ENGINES
For further information write

GLADDEN PRODUCTS CORPORATION
Now In the Third Year of Engine Building
825 Sept. 108, West Colorado, Glendale 4, California

WELLMAN *Williams Type*
MORE YARDAGE PER DAY

● Elimination of excess materials and careful weight distribution permit rapid, rhythmic operation of Wellman Dragline Buckets. Operators can cover a wider digging radius with this streamlined bucket.

Built of special alloy steel, using strong welded design, Wellman buckets provide strength and stamina for long-term economy. Perforated designs also available. You'll do better with Wellman.

Want Facts?
Write for free descriptive bulletins.

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7000 Central Avenue • Cleveland 4, Ohio
DRAGLINE, CLAMSHELL, CUSTOM-BUILT BUCKETS • STONE AND WOOD GRABS

Texas highway engineer, with reference to his experience with 100 per cent solution filling:

"The use of water in large pneumatic tires to increase traction is familiar; also the use of water to replace most of the air to make the tire run cooler. But the advantages and benefits to be gained by the use of 100 per cent water and complete elimination of air may or may not be realized."

In his attempt to cut down loss of time in weed-mowing operations, this Texas engineer tried puncture-proof tubes, reliners, etc., and finally tried using 100 per cent water in place of air. This proved promising, so two or three units were prepared for further study which resulted in the almost complete elimination of punctures caused by thorns and small nails. The use of water-filled tires was then extended to maintainers, with remarkable results. Considerable trouble with "wobble" on the large front wheels now coming out with maintainers was experienced previously, and this "wobble" was completely eliminated when the tires were filled with water.

The engineer's report continues:

"Having these tires filled by commercial dealers cost $4.00 to $7.00 per tire, or $16.00 to $30.00 per unit, so the Equipment Division purchased a unit for filling tires with water, and since then all pneumatic tires except trucks, pickups, and automobiles have been filled, and punctures from thorns and small nails have been almost eliminated. It appears, judging from the service the first water-filled tires have given, that the use of water would practically double the life of the tires. The tire-filling unit used was gasoline-driven and cost $120.00."

Off-the-Road Tires

The accompanying table is for convenience in estimating the amount of water and calcium chloride to be used in filling off-the-road tires 100 per cent full, and the approximate weight increase.

The table does not constitute an approval to use solution 100 in payload-carrying tires.

The tires shown require tubes with special valves to prevent valve failure.

Tire Size	Ply Rating	CaCl₂ (lbs.)	Water (gals.)	Weight in Tire (lbs.)
11.00x20	12	86	25	290
12.00x20	12	116	33	392
12.00x20	16	89	26	302
12.00x24	16	104	30	351
13.00x24	12	137	39	462
13.00x24	18	125	36	422
14.00x20	12	165	47	557
14.00x20	16	145	41	490
14.00x24	20	154	44	520
16.00x20	16	196	56	661
16.00x24	16	255	73	860
18.00x24	16	361	103	1,218
18.00x24	16	333	95	1,125
18.00x24	20	361	103	1,222
18.00x24	24	311	89	1,050
18.00x33	40	452	129	1,528
21.00x24	20	480	137	1,622
21.00x25	20	492	141	1,663
21.00x25	16	564	161	1,906
21.00x29	20	553	158	1,868
24.00x25	24	616	176	2,084
24.00x29	24	693	198	2,343
24.00x29	24	723	207	2,444
27.00x33	30	867	248	2,932
27.00x33	30	1,029	294	3,480

Look out for the man behind the wheel behind the car in front of you.

Telescopic-Shore Bulletin

A folder on a self-contained telescopic steel shore has been released by Safway Steel Products, Inc., W. State St. at N. 63rd St., Milwaukee 13, Wis. Specifications, working load, and instructions for use are given. Special features stressed include all-steel construction, one-man handling, and the elimination of close decking for heights over 15½ feet. In the latter case, shoring can be mounted on standard frame-type scaffolding with adapters that bolt to the base plate of the shore and mount in the legs of the end frame.

This folder may be obtained from Safway, or by using the Request Card at page 18. Circle No. 274.

The MOORHEAD Portable Aggregate Drier

is designed for the purpose of heating and drying aggregate materials. The machine is particularly adapted to drying sand preparatory to mixing for black top road maintenance work. The material is discharged either mechanically or by hand into the hopper and thoroughly heated and dried in traversing the length of the drum. The Moorhead Drier may be furnished either as a portable unit with a standard two wheel trailer assembly or as a stationary unit with a heavy duty skid mounting.

This drier has a capacity of 5 to 10 tons per hour depending upon the moisture content of the material being dried. The standard unit is powered by an air cooled gasoline engine; however, they may also be furnished with electric motor drives. These units are being used successfully throughout the country by contractors in foundries, sand and gravel operations, road maintenance work, sand blasting operations and many other applications where it is necessary to dry aggregate materials.

Write for folder

MOORHEAD MACHINERY & BOILER CO. 927 Second Ave., S. E. Minneapolis, Minnesota

The Surveyor's Notebook

Reporting on Unusual Surveying Problems and Their Solutions

Notekeeper: W. & L. E. Gurley, America's Oldest Engineering Instrument Maker

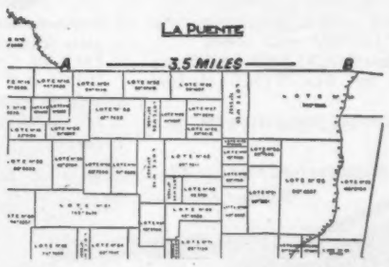
Mexican Jigsaw Puzzle

"Have you ever subdivided 50,000 acres into nearly 200 lots in accordance with rights of 600 people?" asks George S. Salter of the Bureau of Engineering, Chicago's Department of Public Works. "That was only one problem on an assignment down in Mexico 20 years ago.

"The Hacienda of Tanceme, about 60 miles south of Tampico in the state of Vera Cruz, was leased by an oil company with the provision that it be subdivided into lots corresponding to rights of the various owners. These rights, or *derechos*, had been passed down, generation to generation, from holders of the original Spanish land grant, issued around 1800 and delimited by metes and bounds.

"The persons holding rights belonged to about 200 families, so it was agreed to divide the area so as to give each family a lot. This led to quite a complicated puzzle, since each insisted on land where his house or pasture was already located.

George S. Salter, in Mexico, found "my mule as reliable as my Gurley for rough conditions."



Section of map of Hacienda of Tanceme, showing final line of disputed boundary with La Puente.

Settling a Boundary Dispute

"The limits of the hacienda were set by a survey requiring four parties and five months' work, and the area was subdivided. Some heirs could not be found, so one lot was assigned to *desconocidos*, the unknown ones. Then owners of three adjoining haciendas claimed that incorrect boundaries had been used. My job was to straighten them out.

"This involved considerable resurvey work, not to mention patience and diplomacy. We were aided by older men—*los conocedores*, the knowing ones—from each hacienda, who were to agree on dividing lines.

"One hotly-contested boundary was with La Puente to the north. Its people contended that a crucial point in the grant was further south than we had it in our original survey. A new point ('B' on map) was finally agreed on, and a 3.5-mile boundary west to an irregular line had to be re-established.

"This was all brush country; so a *brecha*, a cleared line about 1 meter wide, was cut through to connect 'B' with the original line. We computed the closing in the field; and a new line was cut from 'B' to a new point, 'A.' Believe it or not, using my Gurley Hell Gate 20-second transit, I hit the point within the width of the *brecha*."

We'd like your story for a future page in this series. Drop us a line...we'll contact you for details later. Ask for Bulletin 50 giving complete data on Gurley instruments.

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Every Dart unit is precision engineered and built to heavy duty service specifications. Dart offers both gasoline and electric models —a size for every concrete vibrating job.

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See your Dart dealer or write now for complete literature

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Joins Galion Allsteel Body

Ray W. Warren has been appointed Southeast Special Representative for Galion Allsteel Body Co., Galion, Ohio. With headquarters in Raleigh, N. C., he will direct sales and service of Galion dump bodies, hydraulic hoists, and hydraulic tailgates in Virginia, North Carolina, South Carolina, Georgia, and Florida.

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Prevent tie-ups, delays and costly shut downs!

Keep winter jobs running at summer speed

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means:

1. Spacing of teeth may be CHANGED to suit job at hand.
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We also manufacture 'dozer blades and tyne loading buckets.

Dealer Inquiries Invited

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Distributor Doings

What's Ahead for Distributors?

• WHAT'S ahead for equipment distributors in 1953? Will business hold up? Can present U. S. and foreign construction volume be maintained? What effect, precisely, will the Administration changeover have on the average distributor?

To get answers to these questions,

"It'll be a buyer's market by mid-1953", says Al F. Garlinghouse, President of Garlinghouse Bros. of Los Angeles, as he gets busy on the phone to gear his business up to meet the challenge he's happy to see on the way. *Ray Day Photo*

CONTRACTORS AND ENGINEERS interviewed two well known Los Angeles distributors: A. F. Garlinghouse, President of Garlinghouse Bros., and Beal Shaw, President of Shaw Sales & Service Co., whose views probably reflect what many a distributor is thinking.

"If Ike finds a way to end international crises like the Korean war, we will see a buyer's market by the middle of 1953", declared Al Garlinghouse. "And I, for one, will welcome it. Garlinghouse Bros. started in business in a depression and grew, and I feel sure that business will be sounder with a little of the excess fat trimmed off. At the recent AED regional meeting at Santa Barbara, it was the consensus that distributors faced a gradual tightening up in the near future.

"Mind you, I don't look for a depression. So long as our population continues to grow and shift toward the west, this Pacific Coast area will need an ever-increasing construction program on roads, schools, buildings, dams, water-supply and reclamation works. But it will be better for the country if such projects are justified after careful screening, and as many as possible built by private enterprise.

"The net result to the average distributor will be a quick shift to a buyer's market. Salesmen will soon be selling, instead of taking orders. It seems to me that this will be a healthy thing. I'm for it, and we're making future plans accordingly."

Not so expectant of a quick changeover was Shaw, President of Shaw Sales & Service Co., whose business judgment has in 10 years established his firm in Los Angeles, Riverside, and San Diego. According to Shaw, no immediate recession of business seems possible.

"How can business recede quickly?" Shaw asked. "I can't see the Korean crisis over at least until Uncle Joe feels out the new Administration. I'm hopeful for some firm foreign policy, which will convince all nations we mean business in this fight for peace. Until the major differences are settled, which will take several years, we'll certainly be maintaining our present defense economy.

"Add to this necessity our previous ECA commitments abroad, and you have a *status quo* situation any way you look at it in the predictable future.

HEAVY-DUTY TRENCHER

WITH NEW IMPROVED SELF-CLEANING BUCKET — Capacity ½ yd.

A heavy-duty trench digger, which is designed for a wide variety of trenching for any highlift tractor with hydraulic bucket control.

It will increase the tractor's production from 30 to 50 per cent and is easily attached by one man in 15 minutes.

The Whitestown Trencher is now available for use on the following hydraulic controlled tractors:
Allis-Chalmers HD-5G equipped with TS-5 tractor-shovel
Caterpillar D-4 and Trackson HT-4; Oliver with 4-A Lull loader
International TD-6 & TD-9 equipped with new Bucyrus-Erie dozer-shovel
International TD-8, TD-9 & TD-14-A with Hough bulldozer-shovel
Hough Model HM-Payloader; Trojan Loadster, Models LM-75; LC-100-B

The Whitestown trencher is equipped with a ½-yard standard bucket. Special buckets, made to individual specifications, may be obtained. It will dig to a depth of 8 feet and dump at a height of 12 feet. This trencher has been in constant use for four years, and has proved to be rugged and satisfactory in every way.

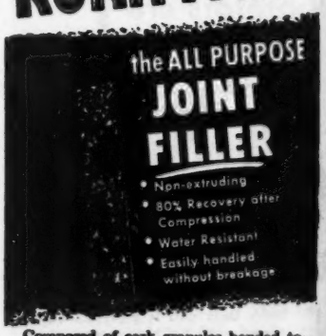
- ***Immediate delivery can be made.***

- ***Please specify make of tractor.***

WHITESTOWN TRENCHER CO., INC.

Wood Road, Whitesboro, New York — Phone: Utica 6-2430

KORK-PAK**



Composed of cork granules bonded together with asphalt between two sheets of heavy asphalt-saturated paper, KORK-PAK is the lowest cost, non-extruding joint filler on the market. KORK-PAK is readily handled without breakage . . . and when used in conjunction with Para-Plastic Joint Seal, always provides complete joint filling and protection.

Write for details and prices on KORK-PAK. Catalog sent without obligation.

****KORK-PAK is one of the many Patented products developed for the Construction Industry by Servicised Products Corp.***

SERVICISED PRODUCTS CORP.
4801 W. 65TH ST. • CHICAGO 38, ILL.

Not so expectant of a quick policy change for distributors is Beal Shaw, President of Shaw Sales & Service. According to him, the international crisis will keep distributors crying for short-supply items for at least several more years. *Ray Day Photo*

"And when the honeymoon is over, we'll slide gradually into a tighter selling market. However, as long as the growing west needs so much construction work, I can't foresee anything like a depression ahead."

Business meanwhile is holding up fine for both firms. Shaw recently received heavy shipments of badly needed equipment, and Shaw intends to carry a substantial inventory of fast-moving units. Construction volume is holding up.

Al Garlinghouse's firm is known over the world for its manufacture of Gar-Bro concrete buckets and other concrete equipment. Various types of controlled air dumping under high and low operating pressures have been developed for these buckets, which are in demand on large dams and other concrete works over the world.

The firm recently shipped 7 concrete-placing buckets to Turkey—three 8-yard, two 6-yard, one 4-yard and one 2-yard—for the erection of a power dam on the Sakarya River. These buckets will be used by a German construction combine which has a construction agreement with the Turkish Government. Concrete equipment is also being shipped overseas to many other points.

Meanwhile, Garlinghouse Bros.' equipment-distribution business is also holding up as all hands gear for a future buyer's market.

Huber Names Two New Dealers

Huber Mfg. Co., Marion, Ohio, has named two new distributors. E. F. Edson Co., 716 Union St., West Springfield, Mass., will handle the Huber maintainer and tandem and 3-wheel rollers in western Massachusetts. E. F. Edson is Manager of the firm.

Contractors Equipment Co., headed by W. W. Burch, will handle Huber's complete line of graders, maintainers, and rollers throughout Georgia. The dealer is located at 916 DeKalb Ave., N. E., Atlanta, Ga.

Dealer Sponsors Demonstration

Approximately 50 contractors, engineers, and other interested officials gathered in Bakersfield, Calif., last November to see for themselves exactly what the Super C Tournadozer can do on a modern housing development. The demonstration was sponsored by Bakersfield branch of Crook Co., Los Angeles distributors, and was held on a huge housing development under construction by the contracting firm of Rexroth & Rexroth.

The machine was hooked to a LeTourneau LS Carryall to demonstrate loading in heavy cuts; it was used as a pusher tractor behind conventional crawler tractors; and demonstrated its power and versatility on dozer work. Highway and irrigation engineers attending the meeting were able to see for themselves what applications the machine had on their work. According to Hal Cady, Crook Co. Branch Manager at Bakersfield, the Tournadozer drew favorable comments from men not previously familiar with the machine.

A Look Into Lorenz Facilities

One day last summer the Muskingum River broke through a dam at Zanesville, Ohio. Water, rushing through the break, flooded a cement mill, thereby completely inundating the plant and equipment. A dealer in Columbus with rental facilities supplied the pumps that worked 24 hours a day for 6 days to remove the water.

This is a case history from the colorful brochure issued by The Lorenz Equipment Co., Columbus, Ohio, distributor of construction and industrial machinery. Aside from rental provisions, the book presents the Lorenz sales and service facilities, photographs of personnel, and glimpses around the company's buildings. Included in the list of manufacturers represented by the dealer are: Pettibone Mulliken Corp.; Bucyrus-Erie Co.; Jackson Mfg. Co.; Schield Bantam Co.; Vulcan Iron Works; American Hoist & Derrick Co.; Huber Mfg. Co.; Gar Wood Industries, Inc.; The Jaeger Machine Co.; and Littleford Bros., Inc.

Headed by Frank Lorenz and Paul Ertel, the company has its main office at 547 W. Rich St., Columbus 8, Ohio. Copies of the brochure may be obtained by writing to that address.

Highway Equipment Co. Dealers

Highway Equipment Co., Inc., Cedar Rapids, Iowa, manufacturer of

(*Continued on next page*)

CENTURY ENGINEERING COMPANY

DISTRIBUTORS

ALA.—Armstrong Equipment Co., 4601 First Ave., North Birmingham 1.

ARIZ.—Superior Equipment Co., 2221 South 19th Ave., Phoenix.

COLO.—*S & M Supply Co., 735 Fourth Ave., Grand Junction.

ILL.—Gill Boers Equipment Co., 7625 So. Kedzie Ave., Chicago 29.

IA.—*James W. Bell Co., Inc., 1720 I Ave. N. E., Cedar Rapids.

KANS.—*Wentz Equipment Co., 600-08 No. Van Buren St., Topeka.

ME.—*Eastern Tractor & Equipment Co., 88-94 Preble St., Portland 3.

MD.—*Free State Equipment Co., 2807 Sisson St., Baltimore.

MICH.—*R. G. Moeller Co., 14415 Meyers Road, (Main Office), Detroit.

MINN.—*Ruffridge-Johnson Equip. Co., Inc., 250 Tenth Ave., So., Minneapolis 15.

MONT.—*Mountain Tractor Co., Box 1524, Missoula.

N. J.—*R. E. Brooks Co., Rt. 17, Hasbrouck Heights.

N. M.—*N. C. Ribble Co., P.O. Box 856, Albuquerque.

N. Y.—John J. King Co., Construction & Ind. Equip., Monroe.

N. DAK.—Schultz Machinery Co., P.O. Box 868, Bismarck.

OHIO—*W. W. Williams Co., 835 W. Goodale Blvd., (Main Office), Columbus 8.

OKLA.—*Wylie-Stewart Mach. Co., Inc., 1400-1426 Exchange Ave., Oklahoma City 1.

PA.—Edelen & Boyer Co., 1717 No. 54th St., Philadelphia 31; Allied Equip. Corp., 1 Glass St., Carnegie.

S. CAR.—*State Machinery & Supply Co., Inc., 1005 Meeting St., West Columbia.

TEXAS—*R. G. Studer Machinery Co., 4900 San Antonio Hwy., Austin 13.

UTAH—*S & M Supply Co., 735 Fourth Ave., Grand Junction; Kimball Equipment Co., 222 West 17th South, Salt Lake City 10.

VT.—*Vermont Road Equipment Co., Inc., Box 98, Montpelier.

WISC.—*Boehck Equipment Co., 2404 W. Clybourn St., Milwaukee 3.

WYO.—*Wilson Equip. & Supply Co., 902 W. 22nd St., Cheyenne.

EXPORT—Rocky Mountain Export Co., P.O. Box 1051, Denver, Colorado.

*Franchised Distributor

You get FULL CONTROL sanding...

One Man Operation with the CENTURY SPREAD-ALL ICE CONTROL UNIT

You have *full control* of direction and width of spread; *full control* for light or heavy spreading; *full control* of intermittent applications when you use the CENTURY Hydraulic SPREAD-ALL for ice control work.

The CENTURY SPREAD-ALL spinner is positioned at low level, never sprays sand on passing cars. And spinner is always parallel with pavement regardless of elevation of truck body.

The truck driver *alone* operates the CENTURY SPREAD-ALL. Truck maintains traffic speed even during intermittent sanding at bus stops or intersections.

Takes only 5 minutes to detach. Mounting bracket cannot interfere with other truck work.

SOUTHERN STATES! IT'S A SEAL-COAT UNIT, TOO!

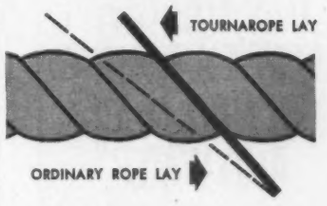
Just replace the spinner with the seal coat tray shown at the right. Provides an accurate, metered, clean-margined mat.

Send for fully descriptive folder and prices. Both attractive! You'll see why city after city is specifying CENTURY. *Send a post card today.*

Century Spreaders — Hydraulic Pumps — Hydraulic Motors and Valves

CENTURY ENGINEERING CO. WAUKESHA, WISCONSIN

LONGER ROPE LIFE with short-lay TOURNAROPE



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1. Improved elasticity
. . . with a flatter twist, Tournarope has more "spring" action, absorbs "shock load" more easily.

2. More flexibility
. . . Tournarope rolls easily over small sheaves and drums.

3. Less bending fatigue
. . . short lay bends strands, wires less . . . gives longer rope life.

4. More resistance to crushing and kinking
. . . the short lay gives you a harder structure that better resists crushing and kinking.

5. More steel per foot
. . . with short lay you get more wire per foot of rope . . . more steel for your money. In 1000' of ½" Tournarope, you get up to 35# more steel than in ordinary rope.

Try Tournarope the next time you replace wire rope on any of your equipment. Send coupon for quotation.

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Please quote on.....feet of.....inch diameter Tournarope.....lay,
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(Continued from preceding page)

spreaders, has appointed the following seven dealers: W. W. Williams Co., 835 W. Goodale Blvd., Columbus, Ohio; Dow & Co., Inc., 1820 Elmwood Ave., Buffalo, N. Y.; Freeborn Equipment Co., Inc., N. Union at Main St., Olean, N. Y.; Syracuse Auto Parts, Inc., 120 N. Geddes St., Syracuse, N. Y.; Cole-Kelly Equipment Corp., 17 Petersburg Pike at Hull St., Richmond, Va.; Chesapeake Supply & Equipment Co., 1213 E. 25th St., Baltimore, Md.; and Cunningham Ortmayer Co., 2016 W. Cornell St., Milwaukee, Wis.

Syntron in Cleveland, St. Louis

The Syntron Cleveland Sales Co. and Syntron St. Louis Sales Co., have each opened new stores. The latter's is located at 4431 Manchester Ave., St. Louis 10, Mo., with the Cleveland firm's at 2919 Carnegie Ave., Cleveland 15, Ohio. Both firms represent and sell the entire line of Syntron vibratory material-handling equipment, selenium rectifiers, etc., manufactured by Syntron Co., Homer City, Pa. In addition, the new stores make available the rental of Syntron power tools—electric hammers, gas paving breakers and rock drills, portable electric saws, drills, and concrete vibrators.

Casey-Metcalf Moves House

Casey-Metcalf Machinery Co., Inc., Los Angeles, Calif., has moved to larger quarters at 5515 E. Slauson Ave. The new plant, offices, shop, and yard cover over 36,000 square feet. The dealer's representations include the following manufacturers in southern California: Minneapolis-Moline Co.; Insley Mfg. Corp.; Seaman Motors, Inc.; Wellman Engineering Co.; Wayne Crane Division of American Steel Dredge Co., Inc.; Meili-Blumberg Corp.; Columbia Steel Casting Co., Inc.; Reese Engineering Co.; and Orton Crane & Shovel Co.

Two Dealers for Maginniss

Maginniss Power Tool Co., Mansfield, Ohio, has appointed two new distributors to handle its line of Hi-Lectric concrete vibrators and generators. They are: Furnival Machinery Co., 54th St. & Lancaster Ave., Philadelphia 31, Pa.; and B-G Equipment Co., Inc., 1180 Scottsville Road, Rochester 11, N. Y.

Joy Dealers in Two States

Joy Mfg. Co., Pittsburgh, Pa., has appointed two new distributors to handle its entire construction line including air compressors, wagon drills, hand-held drills, paving breakers, spaders, tampers, and portable hoists. Southern Gateway Co., 2200 Losantiville Road, Cincinnati, Ohio, will represent the company in southeastern Ohio; Highway Equipment Machinery & Supply Co., 1724 Altamont Ave., Richmond, Va., in a major portion of Virginia. The latter firm maintains branch sales and service facilities at 425 W. Fourth St., Salem, Va.

New Waco Division in Miami

Waco Scaffolding of Florida, Lakeland, Fla., has organized a national steel-scaffolding division in the Miami area for the Waco equipment manufactured by Wilson-Albrecht Co., Inc., Minneapolis, Minn. The new division will merchandise the entire line of scaffolding, including ground scaffolding, mason and scaffolding jacks, material-hoisting towers, and portable elevators.

E. S. Nance heads the Miami Division, which is located at 3270 N. W. 54th St.

Bemiss Opens Salem Branch

With an open house which included displays, luncheon, and buffet dinner, Bemiss Equipment Corp., Richmond, Va., opened its new Salem branch last fall. About 750 people attended the gathering. The dealer had maintained a branch in Roanoke for many years, but due to its growth, moved the office to larger and more adequate quarters in Salem.

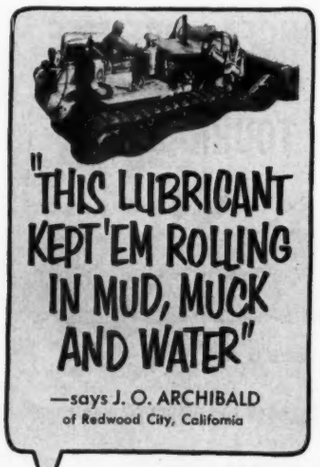
Bemiss is a distributor for Allis-Chalmers tractors, General Motors diesel engines, Bucyrus-Erie shovels, and Chicago Pneumatic tools.

Baker-Raulang in New Orleans

Baker-Raulang Co., Cleveland, Ohio, has appointed Industry Services, Inc., New Orleans, La., a distributor for Baker industrial trucks and cranes in Louisiana and southern Mississippi. The firm, located at 332 S. Diamond St., is headed by Polk Hebert.

Euclid Training Program

The Euclid Road Machinery Co., Cleveland 17, Ohio, is conducting special factory training courses in servicing the company's earth-mov-



"THIS LUBRICANT KEPT 'EM ROLLING IN MUD, MUCK AND WATER"

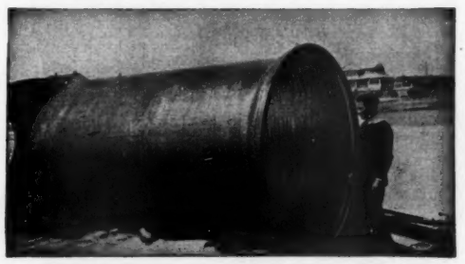
—says J. O. ARCHIBALD
of Redwood City, California

The job was clearing 500 acres of salt marsh for crystallizing ponds. To quote, "We selected LUBRIPLATE No. 107 for track and general lubrication and LUBRIPLATE APG-140 for transmissions and final drives. During the entire job there was no replacements of track rollers nor any tie-ups of equipment due to parts replacement or breakage!"

For nearest LUBRIPLATE distributor, see Classified Telephone Directory. Send for free 56-page "LUBRIPLATE DATA BOOK"... a valuable treatise on lubrication. Write LUBRIPLATE DIVISION, Fiske Brothers Refining Co., Newark 5, N. J. or Toledo 5, Ohio.

REGARDLESS OF THE SIZE AND TYPE OF YOUR MACHINERY, LUBRIPLATE LUBRICANTS WILL IMPROVE ITS OPERATION AND REDUCE MAINTENANCE COSTS.

This is worth looking into



We make CAST IRON PIPE . . . built to last for generations . . . in any size from 2" to 96" with all types of joints. For 97 years, the WF trade mark has meant "Durable Pipe," made with proper crushing, beam, shock and bursting properties.

It's the kind of pipe that stays in service . . . rugged, strong, economical . . . because you can bury it and forget it! Miles upon miles have been underground for almost a century and *still* in good condition when excavated.

BELL & SPIGOT PIPE
SHORT BODY BELL & SPIGOT SPECIALS
FLANGE PIPE • FLEXIBLE JOINT PIPE
CAST IRON ROLLS • CYLINDERS
PIPE AND FITTINGS ALSO AVAILABLE IN HEAT RESISTANT AND CORROSIVE RESISTANT MEEHANITE METAL

•

Also manufacturers of jobbing castings through 20 tons in weight in Alloy Iron, Grey Iron and Meehanite Metals.

Specify WARREN CAST IRON PIPE... *AND BE SURE!*

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55 LIBERTY STREET, NEW YORK 5, N. Y.
PLANTS: Phillipsburg, N. J. Everett, Mass.
WARREN PIPE CO. OF MASS. INC. 75 FEDERAL ST. BOSTON, MASS.
97 Years of Continuous Service

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SAFWAY SCAFFOLDS

IN 137 principal cities

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Only Master Welders work on SAFWAY Equipment
Interchangeable parts constructed by safe, strong, lifetime welding of high carbon tubing.

All SAFWAY Equipment Treated with Rust Inhibitor
Maintains accurate fit of parts and fasteners to assure safe, rigid scaffolds.

Enamel is Baked on All Surfaces, Inside and Out
Improves appearance of equipment—helps insure lasting fit of parts and long life.

All SAFWAY Equipment is Engineered to Last
With only routine care, Safway equipment will deliver a lifetime of safe, efficient service.

Write for this Free Bulletin

RENTED and SOLD by distributors everywhere

SAFWAY
STEEL PRODUCTS, Inc.
6240 West State St.
MILWAUKEE 13, WISCONSIN
Tubular Steel Scaffolding and Equipment

ing equipment. The program, which is open to representatives of equipment distributors, customers, and others who are interested, will continue until early spring, with each course lasting one week. Equipment servicemen may choose any of four beginning and four advanced training courses. Complete enrollment information is available from the company or any Euclid distributor.

C. S. Johnson Dealers Named

The C. S. Johnson Co., Champaign, Ill., has appointed two new distributors. W. C. Caye & Co., Inc., 787 Windsor St., S. W., Atlanta, Ga., will represent the manufacturer in all but 24 southeastern counties of Georgia; Cook Bros. Equipment Co., 1815 N. Broadway, Los Angeles, Calif., will serve Arizona.

A subsidiary of Koehring Co., Milwaukee, Wis., Johnson manufactures a complete line of concrete-batching and cement-handling equipment, including concrete and clamshell buckets.

Wooldridge Depot in Georgia

A factory parts depot has been established in Atlanta, Ga., by Wooldridge Mfg. Co., Sunnyvale, Calif. In cooperation with Statham Machinery & Equipment Co., a Wooldridge distributor at 671 Ford Place, N. E., Atlanta, the depot will provide assistance to dealers in the area through factory sales and service representation. Parts inventories will be maintained for Terra Cobra self-propelled earth-movers, Wooldridge scrapers, power-control units, rippers, bulldozers, and other items of Wooldridge earth-moving equipment.

Iowa Mfg. Names St. Louis Dealer

Missouri-Illinois Tractor & Equipment Co., St. Louis, Mo., has been appointed an authorized distributor for Iowa Mfg. Co., Cedar Rapids, Iowa, manufacturer of Cedarapids material-handling equipment. The dealer's territory includes eastern Missouri and southern Illinois. Sales, service, and repairs on Cedarapids equipment will be made available to the trade in this area at the three company locations: St. Louis, Quincy, Ill., and Charleston, Mo.

Ohio Electric Handles A-C

A new distributor for the pumps and Texrope drive equipment manufactured by Allis-Chalmers Mfg. Co., Milwaukee, Wis., is: The Ohio Electric Supply Co., Inc., 793 Wick Ave., Youngstown, Ohio.

Ohio Electric, of which E. A. Mort is President, will operate for A-C in the Ohio counties of Mahoning, Columbiana, and Trumbull, and in seven northwestern Pennsylvania counties.

Two Dealers for Prime-Mover

The Prime-Mover Co., Muscatine, Iowa, manufacturer of motorized wheelbarrows, has appointed two new dealers. The Jaeger-Lembo Corp., Northern Blvd. at 127th St., Flushing, Long Island, N. Y., will represent the manufacturer in northern New Jersey and southeastern New York. In Indiana, it will be Indiana Equipment Co., Inc., 1244 W. Sixteenth St., Indianapolis, Ind.

Wenzel Promotes Kratky

Raymond Kratky has been appointed General Sales Manager of the H. Wenzel Tent & Duck Co., St. Louis, Mo., manufacturer of FlameZel and RainZel tarpaulins and windbreakers.

No other Barrow Except *Jackmanco has it!*

PRESS FORMED, DOUBLE FOLDED CORNER CONSTRUCTION

Model M11-24B

Oldest and Largest Wheelbarrow Maker in America

- Concrete Carts
- Mortar Pans
- Mixing Boxes
- Salamanders

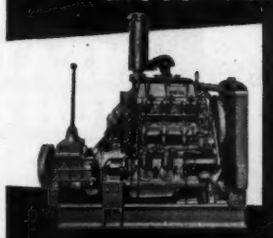
JACKMANCO

Extra strength for long life
Non-Leakable; Easy pouring

This is just one of the many superior features of JACKMANCO Barrows and one of the reasons why contractors buy more JACKMANCO Barrows than any other make.

JACKSON MANUFACTURING CO.
HARRISBURG, PENNSYLVANIA

P&H diesel POWER-PACKAGE



CUTS SHOVEL OPERATING COSTS 45%

Save up to 65% in fuel costs over gasoline . . . cut shovel down time . . . trim maintenance costs and hours . . . get new-machine performance. Dieselize your small shovels — with the P&H Diesel Power-Package!

It's complete, ready for quick on-the-job installation. Fits any make of shovel. P&H 2-cycle design gives you smooth, instant power response — faster digging.

P&H Diesels excel in simplicity, have fewer parts — are far easier to understand and maintain. In just 40 minutes you can replace entire P&H cylinder head and liner assembly as a unit — without dropping the pan!

Get the full money-saving story. Call now about the P&H Diesel Power-Package.

P&H DIESEL DIVISION
HARNISCHFEGER CORPORATION
CRYSTAL LAKE • ILLINOIS

See your P&H Diesel dealer or write us for literature.

BUCK'S new self-dumping CONCRETE BUCKET

. . . cuts your costs even more!

The new **BUCK** ½ cu. yd. bucket — featuring patented **BUCK** "Magic Hand" — gives you automatically-controlled dumping at any level. With this sensational new bucket you can hoist and dump more than 20 cu. yds. per hour!

Even without the new bucket — owners of the **BUCK Automatically-Portable, Heavy-Duty HOISTING MACHINE** report tremendous average savings on "around town" moves!

SAVINGS UP TO $370.00 PER JOB . . . on moves alone!

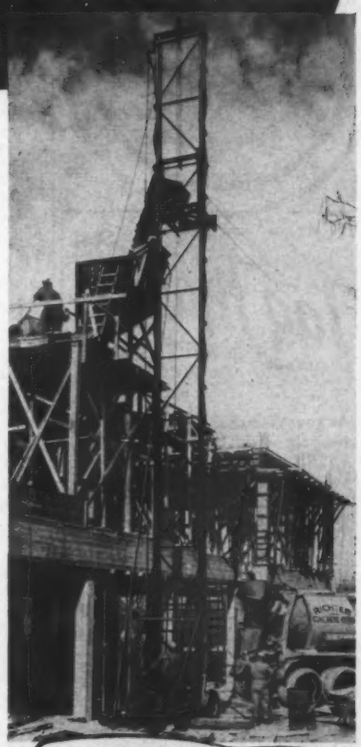
OTHER Machines. Moved in — erected — dismantled and removed at cost of $200.00 to $400.00 per job.

BUCK Machine. Moved in — erected — lowered and removed at cost of only $30 per job!

Your **BUCK** is set up and ready to operate in less than 25-minutes . . . instead of hours! Ready-rigged, self-erecting, self-lowering tower saves you costly set-up. Easily towed by pickup truck, it raises 2000 lbs. at 100 feet a minute.

Removable platform is standard equipment. In addition, a gin pole and 12 ft. Chicago-type boom are available.

Yes, **BUCK** gives you an opportunity to save plenty on every job with: The only complete automatically-portable, heavy-duty hoisting machine in the world . . . plus the most efficient concrete bucket ever designed.
Get the money-saving, time saving, labor-saving facts today.



Buck Automatically-Portable, Heavy-Duty Hoisting Machine equipped with self-dumping ½ cu. yd. Buck concrete bucket is pictured being used for faster, easier concrete hoisting on new $400,000.00 addition to Xavier University, Cincinnati, by Dawson-Evans Construction Co., Cincinnati.

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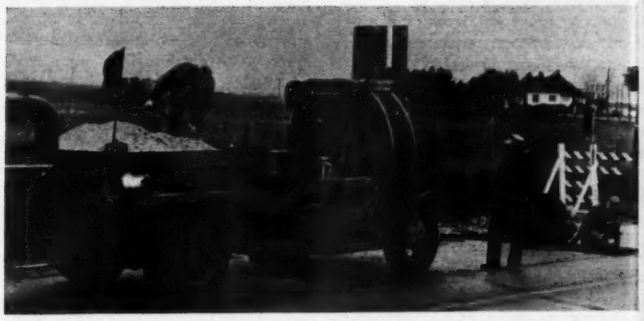
CALIFORNIA, San Francisco — Beatty Safway Scaffolds, Inc.
CONNECTICUT, Waterbury — Contractor's Supply Co., Inc.
GEORGIA, Atlanta — W. C. Caye & Co., Inc.
ILLINOIS, Oak Lawn — Tractor and Equipment Co.
INDIANA, Indianapolis — Reid-Holcomb Company, Inc.
IOWA, Sioux City — Safway Steel Scaffolds Co.
KENTUCKY, Louisville — Embry Brothers, Inc.
MARYLAND, Baltimore — Equipment Rental Co.
MASSACHUSETTS, Boston — Marr Scaffolding Co.
MICHIGAN, Detroit — Safway Steel Scaffolds, Inc.
MICHIGAN, Grand Rapids — Vos Equipment Co.
MINNESOTA, Minneapolis — Safway Steel Scaffolds Co.
MISSISSIPPI, Jackson — Equipment Incorporated
MISSOURI, Kansas City — Funkhouser Machinery Co.
MISSOURI, St. Louis — George F. Smith Co., Inc.
NEW YORK, Albany — Albany Ladder Co., Inc.
NEW YORK, Buffalo — Builders Rental Equipment
NEW YORK, Syracuse — Builders Rental Equipment
N. CAROLINA, Charlotte — Contractors Service, Inc.
OHIO, Columbus — E. W. Norman Co.
OKLAHOMA, Tulsa — Butler-Sparks Equipment Co.
PENNSYLVANIA, Philadelphia — Alliance Equipment Co.
PENNSYLVANIA, Pittsburgh — Equipment Rental Co.
TENNESSEE, Memphis — Tri State Equipment Co., Inc.
TEXAS, Dallas — Safway Scaffolds Co. of Texas, Inc.
WASHINGTON, D. C. — Hudson Supply and Equipment Co.
WISCONSIN, Milwaukee — Stone Manufacturing Co.

BUCK EQUIPMENT CORP. 208 BUTLER STREET CINCINNATI 2, OHIO

Hot-Mix Patching For Iowa Highways

Use of a New Mobile Unit Speeds Road-Repair Work: Hot Method Replaces Cold Patching



An Iowa State Highway Commission truck, loaded with blended aggregate, feeds a Barber-Greene 804 Mixall. *Houck Photo*

• Good performance records are coming in to the Iowa State Highway Commission from the new all-weather system it has developed for highway patching. Daily capacity of regular divisional crews has been materially increased by the new system, which was developed and tested in the Cedar Rapids District. The procedure includes both the method of organizing the work and the use of a mobile hot-mix unit. So far it has produced exceptionally good records in volume of work, as well as an apparent cost-reduction potential by allowing for earlier repairs.

Change in Method

The new hot-mix-patching procedure replaces the former system of cold patching. Regulation full-depth concrete patching will, of course, be continued wherever necessary, and the hot-mix patch will be applied at less than full slab depth, where it is expected to be more durable than cold patches. The new hot patching will not be used full depth except in an emergency to keep a highway open until the concrete patching crews can make the repair.

Test runs with the hot-bituminous patching were inaugurated in the Cedar Rapids District, which consists of 14 counties divided into four divisions. A foreman is assigned to the hot-mix machine and goes with it to each district, where the remainder of the manpower needed is furnished by regular divisional crews.

Equipment Used

No extra equipment is required for use with the mobile patch unit and a sample setup consists of a Barber-Greene 804 Mixall, 4 trucks, a Le Roi Airmaster 160-cfm compressor, 2 Chicago Pneumatic jackhammers, and a portable asphalt kettle. Nine men make up the crew. The truck-mounted air compressor and the two jackhammers were standard equipment for patch preparation before the mobile hot-mixer was added.

Preparation For Patching

Some change in patching technique was necessary—mostly a change of routine occasioned by timing other work to the arrival of the hot-mix unit with its foreman. On pilot runs men were instructed in its use, but that required less than one day.

Full-depth patches except in

"Tag Master"
"Tops" in Bucket Control

As your clamshell "flies through the air with the greatest of EASE," watch the eyes of the "sidewalk superintendents" POP!

You, too, will be delighted with the EASE with which you *cast* the clamshell, or *snub* it, or *twist* it, getting into hard-to-reach corners and picking up hard-to-manage rocks.

You'll find the tagline pull *uniform* at all bucket levels and *adjustable* to fit any job.

In addition you can use your TAG-MASTER as a *dipper-trip!*

Some of these advantages YOU NEVER HAD BEFORE . . . unless you have already used a TAG-MASTER!

For more details about this combination tagline winder and dipper trip, mail the coupon below.

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WEST SPRINGFIELD, MASS.

Please send "Tag Master" details.

Make of our machine .....
Size & model .....
Name .....
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There's A Lansing Barrow For Every Contractor Need!

Lansing Company has been designing and building wheelbarrows for the construction trade since 1881. Experienced design, rugged dependability and quality materials are a part of every model in Lansing's complete line of wheelbarrows.

LANSING
F4½ and A4½
WHEELBARROWS

The most popular barrows on the market for handling wet concrete. Capacity 4 cubic feet. 16 gauge steel trays with new hard enamel finish. Choice of wheels.

ASK YOUR DISTRIBUTOR OR WRITE FOR DETAILS ON LANSING WHEELBARROWS

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LANCO MATERIAL HANDLING EQUIPMENT

Home Office and Factory
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NOTHING ELSE LIKE THE AMAZING NEW

MEAD "MIGHTY MOUSE" BABY DOZER and TRACTOR

USEFUL FOR:
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HIGH LIFT or LOW LIFT MODELS

Also Plows Snow

IT GRADES: Large tread area, "geared to the ground," gives lots of traction for a heavy thrust. You can really push things around with "Mighty Mouse!"

IT CARRIES: Easily carries heavy loads, piles material high, climbs steep slopes.

IT DUMPS: Bucket trip lever at driver's left hand dumps load instantly, effortlessly, exactly where needed.

IT BACKFILLS: "Mighty Mouse" can soon pay its cost on this work alone, doing the work of many laborers and eliminating rental of heavy machines.

Mead's MIGHTY MOUSE High Lift Tractor-Dozer pivots within its own length. Weighs only 1300 lbs. yet dozes and hydraulically lifts a 5 cubic foot capacity bucket up to 6 feet! Machine only 40½" wide, 95" long, 2 speeds forward and one reverse, 6 H.P. engine. Front end attachments are bucket, dozer blade, mower or rotary broom; rear end pulls rotary tiller, cultivator, plow, scarifier, etc.

It's a perfect answer to so many labor problems that we'd like to show you how it will do a dozen jobs wherever you have grading, excavating, back filling, towing, loading, snow plowing, brush removal, site clearing, road building and you think of the rest! Hydraulic lift, just like the big ones.

MEAD SPECIALTIES COMPANY
Dept. T-613, 4114 No. Knox Ave., Chicago 41, Illinois
MAKERS OF QUALITY AIR POWERED TOOLS FOR INDUSTRY

emergencies will not be used on the concrete pavements. Most breaks on the test runs were opened up to a depth of 4 inches. Some patch depths ran to 5 and 6 inches.

Broken and spalled concrete is removed from the bottom and sides of the break after it has been opened up with jackhammers held to an angle to prevent their going through. This gives the hot patch a solid footing and sides. After the jackhammer operation, the chips are shoveled out and the hole is thoroughly cleaned with an air jet. Thoroughly dusted holes are then sprayed with an asphalt primer from an ordinary hand-pumped portable pressure tank.

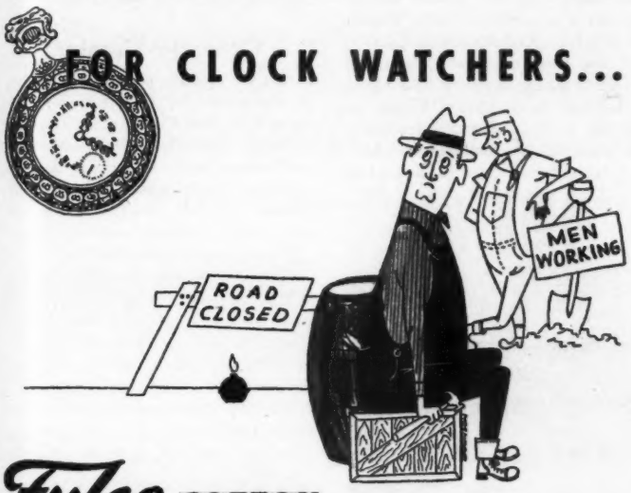
The sequence of operations is for the jackhammer crew with the truck-mounted compressor to lead the procession, opening up designated cracks ahead of the patcher. The next unit is a dump truck containing a load of aggregate and this tows the Mixall. With this setup no barricading is needed, and only one flagman. As with cold patching, there are no traffic delays. Traffic is released over the repaired stretches immediately after the repair crews have left.

The Hot-Mix Machine Is New

The Barber-Greene 804 Mixall, a newly developed machine, is a 2-wheeled unit which is towed behind a dump truck containing a load of blended aggregates. It has two oil-burning burners for heating the aggregate in the drying drum. The rotating drying drum is loaded by hand shovel from the truck to an elevating hopper which rests just

(Concluded on next page)

A Wayer unit compacts a 2-inch lift. *Houck Photo*



FOR CLOCK WATCHERS...

Fulco COTTON CONCRETE CURING MATS

ALL "SET" TO SERVE IN 72 HOURS!

★STAY WETTER LONGER—with less water, usually one wetting is sufficient.
★INSULATE AGAINST SUDDEN TEMPERATURE CHANGES—increasing curing efficiency and flexural strength.
★MAY BE USED OVER AND OVER AGAIN—making cost per job negligible.

Extensive field and laboratory tests of the United States Department of Agriculture have proved conclusively that cotton concrete curing mats cure concrete more effectively than any other method! And when time counts—you can count on sturdier, tougher Fulco mats to cure your concrete quicker, better, and cheaper! See your equipment dealer for prices or wire direct.

We also manufacture sturdy, Fulton Triple-Strength Tarps, drop cloths and tents. Indispensable protection at economical prices.

Fulton BAG & COTTON MILLS
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Owens . . . are FAMOUS for "FIRSTS"
. . . First choice of the clamshells amongst progressive contractors and operators who "dig for" profits, large or small, all over the world.
An OWEN BUCKET takes the "first" bite into the earth. Starting the new $5,000,000 E. 55th Street Interchange with Shore Drive. Cleveland, Ohio
"A mouthful at every bite"

THE OWEN BUCKET CO.

Cable Address "OWENCO"

6030 Breakwater Avenue • Cleveland, Ohio

Branches: New York, Philadelphia, Chicago, Berkeley, Calif., Fort Lauderdale, Fla.

Hot-Mix Patching For Iowa Highways

(Continued from preceding page)

above ground level and which is also the measure for the aggregates in the batch. The machine is self-powered with a 7-hp air-cooled gasoline engine which operates the drying drum, the hopper hoist, and the pugmill.

Aggregate with a moisture content of 4 to 6 per cent can be heated up to 300 degrees, mixed with hot bitumen, and discharged into a wheelbarrow ready for the patch, all in 3 minutes. By positioning, the discharge from the pugmill can be made directly into the patch. Capacity of the machine is 3 cubic feet per batch. When the aggregate in the drum dryer is ready for the pugmill it is discharged by lever operation, the pugmill having already been supplied with a measured quantity of bitumen.

Placing the Patch Material

Crews have demonstrated that they can place 10 tons of hot patch material in highway breaks in a regular day's work. The average amount placed runs between 7 and 10 tons.

Present procedure is to place the hot patch material in 2-inch lifts, compacting each lift thoroughly. A Wayer gasoline-engine-driven compactor is used, and the next lift is added when compaction has been completed.

Aggregates

It is sometimes a problem to maintain uniformity of aggregates for hot-mix patching to insure uniformity of results. The Highway Commission has solved this one neatly by having a strictly supervised mix manufactured at a central point. In the Cedar Rapids District it is made in Cedar Rapids by the Concrete Materials Co.

If the patching crew is working within trucking distance, the blend is trucked from Cedar Rapids to the job. If the distance is too great for trucking, the material is shipped in railroad cars to a central point in the county where the work is to be done. The crew then trucks it away as needed.

The Mixall can back directly up to the patch to discharge its load, though in this case it is being done by hand. *Houck Photo*

The blend consists of 50 per cent graded ½ inch down, 40 per cent fines (lime dust), and 10 per cent sand. This is thoroughly blended before delivery and it gets another good shaking up when it hits the rotating drying drum of the Mixall.

Personnel

Fred R. White is Chief Engineer for the Iowa State Highway Commission, and W. H. Root is Maintenance Engineer. J. A. Paulsen is District Engineer for the Cedar Rapids District, and R. M. Tutten is Assistant District Engineer.

Concrete Vibrator

A new electric concrete vibrator is announced by the Dart Mfg. & Sales Co., 1246 Champa St., Denver 4, Colo. The GM 240-D has dual multi-directional eccentrics desynchronized 45 degrees. The new head is said to give a wider range of amplitude-frequency combinations.

The company states that the high-frequency controlled-amplitude vibration of its product causes the head to remain in continuous contact with the aggregate and makes possible the pouring of lower-slump concrete without segregation.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 330.

Gar Wood Moves Subsidiary

Gar Wood Industries, Inc., Wayne, Mich., is moving its National Lift Co. subsidiary from Waukesha, Wis., to the company's recently acquired United Stove Co. plant in Ypsilanti, Mich. In addition to using the plant facilities for manufacture of the National Lift products (including the Jumbo and Dump-O-Matic line of dump-body hoists, Lift-O-Matic elevating tail gates for pickup trucks, and hydraulic snow-plow control units), Gar Wood will continue to manufacture United Stove products (including the Savoil line of kerosene and fuel-oil features).

Ross Miller, General Manager of National Lift, will continue to direct distribution; Kenneth B. True, recently elected Vice President and General Manager of the United Stove Co., will direct manufacturing operations.

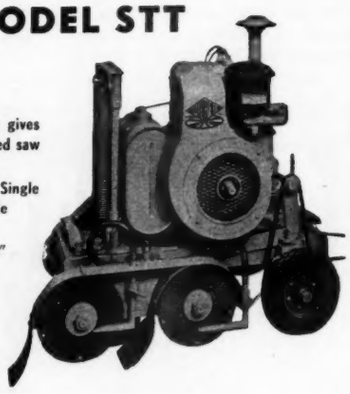
CUTCRETE MODEL STT

Concrete Saw

Tandem Trail Blade step cutting gives twice the speed of any other designed saw

Change over in 15 minutes to Single Trail Blade and Tandem Trail Blade

Single Trail Blade accommodates 8" to 20" blade, will saw to 8" depth



STEP CUTTING REDUCES LABOR COSTS 50%

Write for full details to:

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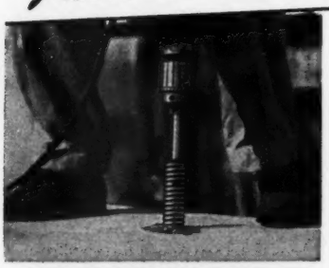
Pasadena 8, California

Fastest **THROUGH CONCRETE**



and **YOU GET**

MORE HOLES PER DRILL

with **TERMITES**

(ask any TERMITE user)

NO MASONRY TOO TOUGH . . .

Where ordinary drills fail, TERMITES *keep going* to give you today's fastest and lowest-cost masonry drilling! Here's why:

1. **TERMITES' *continuous* spiral worm, beginning at the grinding inserts, starts to carry away material the instant it is pulverized.**
2. **TERMITES' exclusive "WICTU" inserts last longer and cut faster.**

Use TERMITES on your next drilling job . . . they're engineered to give you "more holes per dollar." Diameters from ¼" to 5". Lengths up to 36". Use with electric drills. Literature available.

Order today through your distributor

TERMITE ROTARY MASONRY DRILLS

Made only by TERMITE DRILLS, INC.
87 N. Lotus Ave. Pasadena 8, California

Invest In

U.S. DEFENSE BONDS

Now Even Better

Sterling **WOOD HANDLE WHEELBARROWS**

No. D4W — for handling sand and other dry materials. 14 ga. tray. Max. cap. 4 cu. ft.

Wheel Your Materials . . . at LOW COST!

You'll like these new, lightweight, easy-wheeling Sterlings, designed for faster material transport service. Famous Sterling balanced construction puts 80% of the load on the wheel . . . only 20% on operator. Equipped with long wood handles, formed to fit operator's hands. Steel channel legs and reinforcements are just the right height. Means less stoop for operator and greater leg clearance. Steel wheel, roller bearing wheel with pneumatic tire or zero pressure cushion type wheel, can be furnished. Write for new Wheelbarrow Catalog.

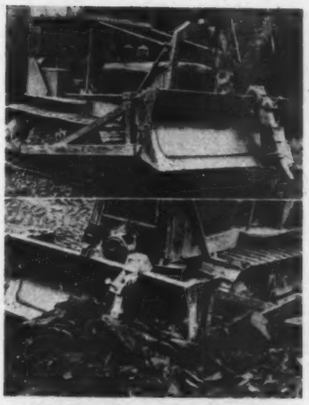
STERLING WHEELBARROW CO., Milwaukee 14, Wis.

Look for this Mark of STERLING Quality

Sterling WHEELBARROWS

A New Dozer-Rooter

A new dozer-rooter is announced by Electric Steel Foundry Co., 2141 N. W. 25th Ave., Portland 10, Oreg. The Esco Buck Forte is a tooth-shank housing which mounts on the moldboard of a bulldozer by a special clamp. Adapters and saddles enable it to fit most makes of heavy-duty dozers. The rooter shank has four adjustments of ripping depths below the dozer's cutting edge and is equipped with box-type replaceable points. The rooters can be attached in pairs or used singly.



The Esco Buck Forte fits most types of heavy-duty dozers.

An advantage is that it enables the operator to rip, root, and doze at the same time. It is mounted and demounted without special equipment and it can be carried in a pickup truck or on the dozer.

Further information may be secured from the company by requesting Folder No. 194. Or use the Request Card at page 18. Circle No. 281.

Guardrail Literature

The Barrier-Beam guardrail is the subject of a booklet published by United Steel Fabricators, Inc., Wooster, Ohio. In addition to photographs of typical installations — highways, bridges and bridge approaches, parks, parking lots, and other enclosures—the booklet includes engineering data and drawings, erection instructions, specifications, etc.

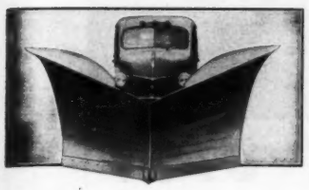
This literature may be obtained from the company, or by using the Request Card at page 18. Circle No. 288.

GET BETTER RESULTS WITH GLEDHILL EQUIPMENT

Through Many Years—For Many Reasons

A very satisfactory, sturdily built machine for shoulder maintenance and patrol work. Strike-off blade increases effectiveness and versatility.

This roadside weed sprayer is a self-contained, towed unit with separate hand boom and 50' hose. Chemical control is easy, effective and economical.



This V-Plow heads a line of 23 models—including V's, one-way, reversible. They are standard equipment on many state highway departments—proof of performance and preference.

The 2½-yd. size (illustrated) can be pulled by any wheel or small crawler type tractor. Front dump type—hydraulic controls. The 1¼-yd. size equipped with either manual or hydraulic control.

Get the facts—and you'll get Gledhill!

Reputable distributors interested in handling the Gledhill line are invited to see our representatives at the Conrad Hilton Hotel during the A.E.D. meeting, February 1-5.

THE GLEDHILL ROAD MACHINERY CO.
GALION, OHIO

MORE WORKING HOURS FOR YOUR EQUIPMENT!

REBUILD GYRATORY, ROLL & JAW CRUSHERS WITH . . .

MANGANAL

U.S. PATS. 1,876,738—1,947,167—2,021,945

11% - 13½% Manganese-Nickel Steel

ROUND APPLICATOR BARS

- Workharden under impact and abrasion to 550 Brinell.
- Tensile strength up to 150,000 p.s.i.
- Outlast new ones — cost less, too.
- 11 sizes for all conditions of wear.
- Use MANGANAL Bare or Special Tite-Kote ELECTRODES to fill in low spots and attach Applicator Bars.

FREE
Literature on latest methods for speedy and economical repair of worn equipment.
NEAREST DISTRIBUTOR UPON REQUEST

STULZ-SICKLES CO.
SOLE PRODUCERS 92 N. J. RAILROAD AVE. NEWARK, N. J.

Sensationally New!

CARVER'S

1½" LIGHTWEIGHT CHAMP

The Lightest A.G.C. Rated Pump on the Market Weighs Only 55 Pounds

Tops in Performance and Real Economy Too. Fast Priming—Moderate Engine Speeds Fully Meet A.G.C. Model 4M Standards

Durable and Dependable Construction. Backed by CARVER'S One Year Guarantee. Briggs & Stratton 2 HP. Engine

Price — Only $125.00

Advanced design and engineering skill puts CARVER far ahead of the field. Simple, compact (17" x 15" x 15") and so light one man can carry it with ease over any kind of terrain. Prime it only once—self-priming thereafter. And economical to operate too—will deliver over 30,000 gallons of water per each gallon of fuel. Self-cleaning, trash-free, open-type impeller. Trouble-free greaseless shaft seal that has been proven and reproven in the field. And many other features too numerous to mention here. Send for Bulletin No. 152. Made for electric motor and belt drive operation also. Whatever your pumping problem, see your CARVER distributor today.

Model L and H | Model WHI | Model "K" | Model FXL

CARVER PUMP COMPANY, 1404 Hershey Ave., Muscatine, Iowa

CARVER PUMPS

Republic Sales Personnel

Myron C. Meyer has been named Manager, Wire Braid Hose Sales, for the Republic Rubber Division of the Lee Tire & Rubber Corp., Youngstown, Ohio. In this capacity, he will direct the sales activities of the Division's new line of wire-braid hose now being produced in a new $2,500,000 plant addition. Most recently Assistant to the Sales Manager, Mr. Meyer has been with the company for 34 years.

A further appointment is Wayne H. Hunter to the post of Assistant Sales Development Manager. He will assist J. M. Hughes, Sales Development Manager, in advertising, sales promotion, and sales training for the merchandising of Republic's line of belting, hose, packing, and molded-rubber products.

New Bead Dispenser For Highway Striping

A new dispenser of reflectorizing beads for highway-stripe marking has been announced by the G. D. Bavin Co., 2500 W. Sixth St. Bldg., Los Angeles 5, Calif. The unit is geared to the speed of the truck to give uniform distribution of beads. The dispenser adjusts for any stripe width up to 6 inches. A flexible rubber chute permits passing over surface obstructions without damage to working parts.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 329.

Morris Machine Personnel

R. E. Jacoby has been appointed Chief Engineer of Morris Machine Works, Baldwinsville, N. Y., manufacturer of centrifugal pumps. He has been with the company since 1947. A further appointment is W. M. Mercer to the post of Sales Manager. He succeeds William H. Pfarrer, who recently became head of the company's Chicago, Ill., office.

Eliminate 70% to 90% of Conveyor Downtime

Cedarapids Schrock Built by IOWA

MOTORIZED HEAD PULLEYS

eliminate maintenance on chains, belts, sprockets, Universal drives, countershafts, etc.

U.S. Pat. No. 3548399—Others Pending

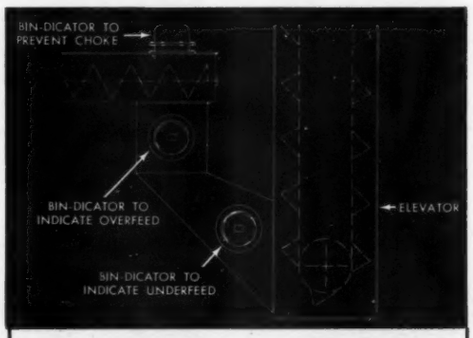
EVERYTHING is contained INSIDE the pulley shell!

HERE'S a money-saving departure from conventional conveyor drives. A Cedarapids-Schrock *Motorized* Head Pulley is simply a new application of the long-proven gear reduction drive, with everything... electric motor, reduction gears and all moving parts... contained inside the drum, completely protected from grit, dirt and weather and with no outside parts or motors to service. 70% to 90% of conveyor trouble and downtime is saved by eliminating the exposed parts necessary with conventional pulley drives. In operation, the pulley shell rotates about the electric motor which is held stationary by a torque arm attached to the conveyor frame. The speed of the shell depends on the combined reduction ratio of the pinions and gears inside the shell. Compact, easy-to-install, job-proved Motorized Head Pulleys are available in sizes from 5 to 30 HP and in various widths.

Find out all the advantages of converting your belt conveyor or belt-bucket elevator installations to *motorized* efficiency before you need head pulley replacements. See your distributor today, or write for Bulletin MP-1.

IOWA MANUFACTURING COMPANY
Cedar Rapids, Iowa, U. S. A.

Built for sale in Arizona, California, Nevada, New Mexico, Southern Oregon, Southwestern Utah and Texas by
YUBA MANUFACTURING CO.
(Pulley and Sprocket Department)
Benicia, Calif.



CHOKE-UPS!

IN CONVEYORS and ELEVATOR LEGS

damage equipment—waste materials cause lost time—start fires

PREVENT SUCH LOSSES with BIN-DICATOR, a diaphragm operated switch

Free catalog describes applications, gives details and dimensions of models with numerous wiring diagrams.

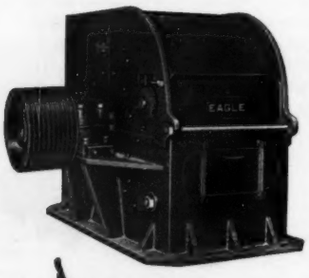
THE BIN-DICATOR COMPANY
13946-M Kercheval Avenue • Detroit 15, Michigan

MAYBE YOU, TOO, OUGHT TO CONSIDER

EAGLE EQUIPMENT

When state highway departments have "fleets" of these loaders—using them the year 'round for loading any loose material from windrows or stockpiles—it indicates a degree of satisfaction which merits your attention. These dependable loaders are one-man operated, load from 3 to 5 yards per minute and get from job to job at highway speeds.

Just pin this ad to your letterhead, send it in, and we'll send you detailed specifications promptly. Check here ☐.



MODEL 36-42 HAMMERMILL

For uniform high rated output for easy access to replace wear parts—there's no mill that's the Eagle's equal. For many applications it would pay you to consider having Eagle crushers right on the job.

Tell us about your problem and let us send you detailed specifications. Check here ☐.

EAGLE CRUSHER CO., Inc. GALION OHIO-U-S-A

JAW CRUSHERS · IMPACT BREAKERS
PULVERIZERS · CONVEYORS · LOADERS

DO THOSE PLOWED-FIELD JOBS THIS WINTER
While the ground is frozen!

NO CROP DAMAGE • NO MUD • BETTER PUBLIC RELATIONS

PENGO EARTH AUGERS

★ Twin helix—no back thrust!
★ Bores true, clean holes in any soil, most sandstones and hardpans, frozen ground, permafrost!
★ All wearing parts replaceable on job!
★ Made in 15 sizes, 10" to 54" hole diameters, to fit all makes of heavy-duty earth boring machines. Larger sizes on order.

PENGO CUTTING HEADS

★ Easy installation — welds to your present helix.
★ Bores where you never could before!
★ Wearing parts replaceable on the job, interchangeable with PENGO Auger parts.
★ Made in 9 sizes, 8" to 24" diameters. Larger sizes on order.

PENGO ANCHOR AUGERS

Specially designed to bore holes for expanding anchors. 3-flight helix carries dirt out fast — completes hole with half the usual trips down and up! In 9", 11" and 13" sizes for 8", 10" and 12" anchors. Parts and features same as PENGO Augers.

PENGO BUCKET CUTTERS

Fast-digging PENGO Auger helix to weld to your present bucket bottom hinge. Available for buckets 16" through 36" in diameter. Offers same money-saving features as PENGO Augers.

"Get the PENGO WISDOM TOOTH"

It knows how to bore holes"

Quick-replaceable, drive-on *PENGO Wisdom Teeth are cast from special abrasion and shock-resistant steel alloy; give far longer service life! Used on all PENGO Augers and Cutting Heads.

ORDER NOW. SEND FOR LITERATURE: PRICES

PETERSEN ENGINEERING CO.
Manufacturers
Santa Clara, California

Euclid's Michigan Dept.

A parts depot has been opened in the upper peninsula of Michigan by The Euclid Road Machinery Co., Cleveland, Ohio. Located at 107 Lincoln St., Negaunee, Mich., the new office is an extension of service provided by the Euclid factory branch at Hibbing, Minn. Walter Vranesh, formerly of Hibbing, is Manager.

NEW QUICK-ON
TRACK TENSION BOLT

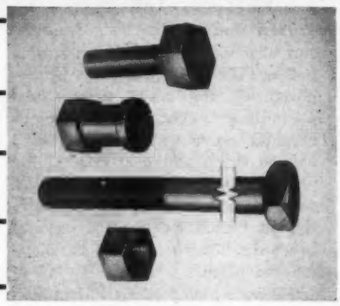
TRACK TENSION BOLT PARTS

SBM-No. 8
QUICK-ON
(U. S. Pat. No. 2506619)

No. 808
ADJUSTING NUT

No. 801
TENSION BOLT
(37¼" long)

No. 802
SPRING TENSION NUT



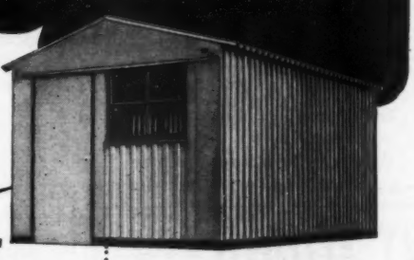
FOR D8's ONLY . . . .

SILVER BOOSTER now gives you a complete "package" of tension bolt parts. Keep one of these Quick-On emergency kits on hand for every D8 . . . and guard against those costly delays due to broken tension bolts. Quick-On Bolts can be installed right on the job! Saves you 6 to 8 hours on every breakdown. Order from your tractor dealer today or write direct. Immediate delivery.

SILVER BOOSTER MANUFACTURING CO.
132 W. VERDUGO AVE., BURBANK, CALIFORNIA

PORTABLE
HANDY-HUT

ALL-STEEL UTILITY BUILDING

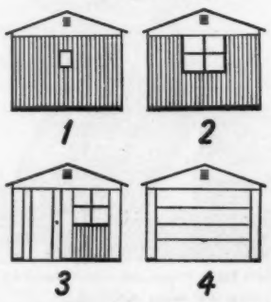


✓ 10'x12' to 10'x20'
✓ ½ DAY TO ERECT
✓ FULLY SALVAGEABLE WHEN DISMANTLED

Here's a portable or permanent small, all-steel building that is delivered ready to erect. No cutting, fitting, riveting or welding needed. Full 7½ ft. headroom and any length from 12 ft. to 20 ft. in 2 ft. multiples. Bolted frame and clip and wedge sheet attachments permit easy dismantling. Choose from *four types* of rear panels to suit your needs.

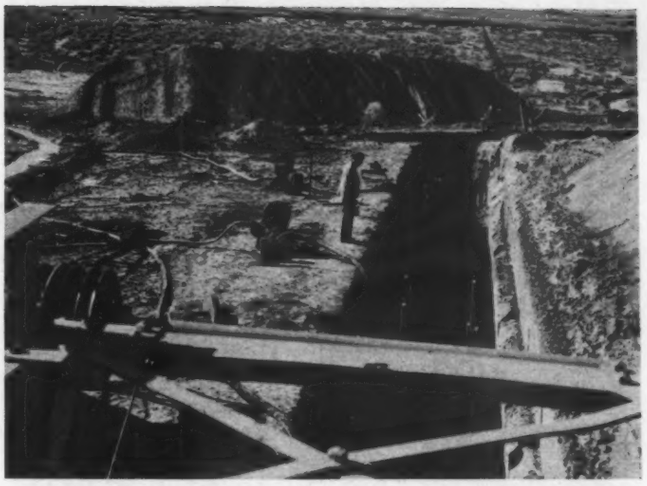
RECOMMENDED USES
Contractor's Office • Storage House
Tool House • Work Shop • Pump House
Watchman's Shelter • Field Office
Railway or Highway Maintenance Shed

4 STYLES
of rear wall panels can be chosen to suit your needs.



WRITE *for descriptive bulletin or estimate.*

USS
UNITED STEEL FABRICATORS, INC.
WOOSTER, OHIO
PRODUCTS Hollow Metal Doors • Prefabricated Metal Buildings • Window Wells
Highway Guard Rail • Bridge Flooring • Corrugated Metal Pipe



Contractors laying a sewer pipe across the Mojave Desert in California keep the step-down trench dry with Barnes 3-inch pumps. *Ray Day Photo*

Waterlogging Threat To Desert Sewer Job

Round-the-Clock Pumping and Step-Taper Excavation Defeat Danger of Ground Water Under Dry Soil

• IN the heart of the Mojave Desert near Lancaster, Calif., where flooded construction jobs are the rarest things on earth, four diaphragm-type 3-inch pumps worked day and night recently to let two sewer contractors work. Paul Vukich Construction Co. and Charles T. Brown Co. of Los Angeles were the contractors, and the job was a 20,000-foot outfall sewer leading from Lancaster across the desert to the site of a future treatment plant. Steady pumping and a novel step-taper method of trench excavation to reduce caving danger highlighted construction difficulties which Vukich and Brown succeeded in whipping to a finish.

Only 4 feet below the surface of one of the driest deserts on earth, ground water begins and extends on down through the pervious sandy-clay formation. The outfall-line gradient, set by engineers of the Los Angeles County Sanitation District, was such that a 15-foot-deep trench was necessary near the treatment-plant terminus. A surcharged dirt load on top of the ground, coupled with the saturated condition beneath, seemed certain to lend itself to abnormally bad caving in the top part of the trench.

Step-Method Excavation

After studying the situation, Con-

(*Concluded on next page*)

CUT TIME between jobs...
get extra production from slow machines
with MILLER Tilt-Top!

MILLER "B" 10 ton shown above loading D-4 tractor

You'll find MILLER Tilt-Top the handiest trailer for cutting between job travel time on your slow machines. Heavy units are loaded by one man in less than two minutes. Operator drives unit on platform—it tilts, locks . . . and he's on his way with no lost motion.

MILLER Tilt-Top saves even more time than other more cumbersome trailers with its better maneuverability, and easier backing. Best of all, MILLER'S exclusive mass production of Tilt-Top trailers cuts original cost for you. Get this extra help . . . extra production now — see your MILLER dealer today!

handier
easy-to-back
priced right

Model "B" 10 ton $1175
Optional equipment (priced extra) 16' long platform (8'x14' standard), hydraulic tilt control, 2 speed hand winch and electric brakes.

MILLER Tilt-Top TRAILERS research engineers
Trade mark reg.
Dept. C-1, 456 So. 92nd Street, Milwaukee 14, Wis.

Waterlogging Threat To Desert Sewer Job

(Continued from preceding page)

tractor Paul Vukich decided to excavate the trench in three sections, using berms to narrow down the ditch. Circular digging buckets on a Buckeye ditching machine permitted the upper 4 feet of the trench to be excavated 12 feet wide. A 2½-foot berm was left on each side of the excavation at that point, and 4 feet of 7-foot-wide trench was excavated simultaneously by another set of rotary buckets. The remainder of the ditch, dug by the Buckeye bucket line, was 4 feet wide—enough to take the 24-inch concrete pipe with room to spare.

This step-down method reduced the side loading along the upper part of the trench so markedly that no caving occurred in the first 2,000 feet of the job. It was of course unnecessary to brace anything but the 4-foot trench in the bottom of the ditch, so the scheme saved money. The Buckeye machine had enough

A P&H crane swings a section of pipe in position as a Buckeye ditcher digs the trench behind. *Ray Day Photo*

power to dig the big section at a rate of about 300 feet per day, so the pipeline crew could move right along.

The severe ground-water seepage problem was handled by bringing in 4 Barnes 3-inch diaphragm-type pumps, and lifting the seep water from sumps in the ditch. Driven by Wisconsin gas engines, the Barnes pumps worked day and night to maintain the ditch in a dry condition, so pipe sections and fine-grade could keep closed up tight with the ditching machine. Not only did these pumps handle the ground-water situation, but even a heavy fall rain lasting two days failed to flood the exposed hole.

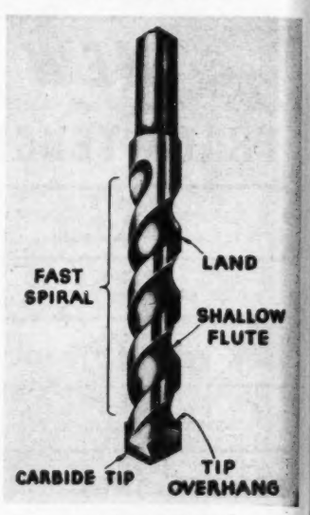
Vukich and Brown organized the project precisely, maintaining definite schedules for each operation. Grade was cut ahead of the ditching machine by an Adams 511 motor grader, and the ditching machine ran to a tight line set from survey points. Fine-grade was made by undercutting the ditch slightly and backfilling with 1½-inch-minus crushed gravel, which acted as a French drain and also cradled the pipe nicely. Trench timbers, 2 x 12, secured top and bottom by Duff-Norton trench jacks, were used to brace the lower portion of the step-tapered ditch.

Concrete pipe sections 10 feet long were trucked to the site, unloaded, and handled to the ditch by a P&H 150 crane. Workmen in the trench spotted each section exactly on line and grade with the help of a tight string, and the joints were then immediately mortared to make them tight. Backfill was pushed in by a small Caterpillar-mounted dozer blade, and the trench bracing was removed when the pipe was covered. By keeping the entire operation tightened up, less ditch was exposed to rains and the Barnes pumps did their high-lift job easily.

Lancaster is one of the fast-growing cities in the Mojave Desert north of Los Angeles, and the presence at Palmdale of a new jet-aircraft center will doubtless do much to make Lancaster grow even more. By putting in the new outfall sewer in good time, to be followed shortly by a sewage-treatment plant, city officials and Los Angeles County Sanitation District engineers hope to be ready for the sewage-disposal problem that is sure to come.

Self-Cleaning Drill

A new fluted masonry drill that automatically lifts dust from the hole as it drills has been announced by the Carboloy Department, General Electric Co., Box 237, Roosevelt Park P. O., Detroit 32, Mich.



The new drill, which has been successfully used in tests on all types of masonry, including concrete, brick, plaster, slate and asphalt, is available in a complete range of commonly-used sizes, from 5/16 inch up.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 306.

Conveyor-Belt Coating

A revised catalog on Magic-Vulc anti-abrasion and anti-corrosion plastic-rubber coatings for repairing conveyor belts and protecting equipment has been released by the Magic Chemical Co., 121 Crescent St., Brockton, Mass.

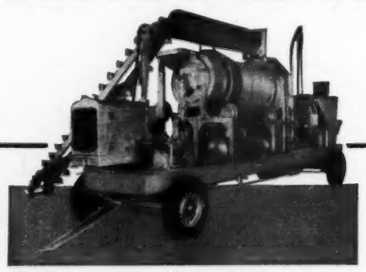
Sections of the new catalog describe methods of application and types of equipment that can be treated. Instructions stress that the rubber coating may be applied to worn conveyor belts without removing the belt from the pulley, and without the use of heat or special machinery.

This catalog may be obtained from the company, or by using the Request Card at page 18. Circle No. 267.

New Caterpillar Plant

A long-time lease for a warehouse and parts-processing plant has been executed by Caterpillar Tractor Co., Peoria, Ill. The one-story structure, which will cover about 300,000 square feet, will be erected on land immediately adjacent to the company's plant site at York, Pa. This new unit should be of interest to the armed services and Caterpillar distributors and customers on the eastern seaboard and in Europe. According to the company, there has been a growing need for such facilities strategically located with relation to the east in general and the ports of Baltimore, Philadelphia, and New York in particular.

Caterpillar expects to employ some 1,000 persons in the manufacture of certain replacement parts at its York plant, which is scheduled to start limited production in the summer of 1953.



Portable Asphalt Plants For City, State, Repairs and Small Contract Work

These 8-10 tons per hour Asphalt Plants economically repair almost any pavement. Asphalt, brick, concrete, macadam, can be resurfaced or patched. Alleys, driveways, sidewalks, industrial plants can be paved.
Produce for immediate hot laying, or for deferred cold patching. Match any bituminous surface.
Mixes at plant, including labor, fuel, and overhead, cost about $4 per ton, with $2 aggregate. Average 160 to 200 sq. yds. 1" thick per hour. A money-maker for small contract work. Also larger plants, 15 and 30 tons per hour.

Write for catalog and name of nearest dealer.

Elkhart 9 White Mfg. Co. **Indiana**

DO YOU LIKE YOUR EQUIPMENT TOUGH?

Galion Model 700 hydraulic hoist with Model 12 contractors' heavy duty body.

▶ If you need dump truck equipment that is built to take a beating day after day without downtime . . . that will work longer with less maintenance and operating cost . . . that you can be proud to own and operate . . . you should become a Galion user—right away!

▶ There's a standard Galion model to meet virtually every need of every contractor. But, if you need extra heavy duty units for jobs that are tougher than tough, Galion will be glad to design and build them to your specifications. A-6720

Just see your nearest Galion distributor—today!

THE GALION ALLSTEEL BODY COMPANY • GALION, OHIO

Oil-Dispenser Unit

A new bulk motor-oil dispenser that delivers a measured quart of oil at the touch of a button has been made by the Gray Co., Inc., 1015 Sibley St., Minnneapolis 13, Minn.

The Quart-O-Matic is said to deliver a quart of fluid in six seconds. Less-than-quart quantities can be dispensed by releasing the button

when the desired amount has been reached. The unit immediately recharges and stands ready for the next full quart delivery.

The new dispenser operates on a minimum of 50 pounds of air pressure. It is designed to operate in all 15, 30, and 55-gallon drums and will fit all highboys by using a simple adapter.

Further information may be secured from the company. Or use the Request Card at page 18. Circle No. 290.

Form-Erection Folder

A 4-page form-erection folder is available from Symons Clamp & Mfg. Co., 4249 Diversey Ave., Chicago 39, Ill. It explains erecting and stripping. It describes the system and what it consists of, including panels, corners, pilasters, fillers, wale tie, tightening wedge, short connecting bolt, two-way form tie, and long connecting bolt. Detailed information is given on high-strength, light-construction, and all-wood panels.

The folder also contains important facts about the erecting and care of Symons forms and factors that will affect concrete pressure.

This literature may be obtained from the company, or by using the Request Card at page 18. Circle No. 362.

P&H Opens Alabama Office

Harnischfeger Corp., Milwaukee, Wis., celebrated with an open house and barbecue the official opening in October of its large new sales office, warehouse, and service station at Birmingham, Ala. The opening also announced the consolidation in Birmingham of all territory formerly served by P&H offices in Memphis, Tenn., and Jacksonville, Fla., though sales representation will be retained in those two cities.

Located on a 4-acre site at 1629 Vanderbilt Road, the plant is within 10 minutes driving time of the airport and has direct rail connections through a spur line of the Louisville & Nashville Railroad which runs into the building. Among the P&H machines and equipment on display are three heavy-duty Trav-Lift cranes which are available to meet the service needs of the customers.

Ray M. Calkins, former Memphis District Manager and associated with the company for 28 years, heads the new plant and territory.

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INVITATION TO BID

SEALED BIDS WILL BE RECEIVED IN THE OFFICE OF THE ENGINEERING AND CONSTRUCTION DIRECTOR, PANAMA CANAL COMPANY, BALBOA HEIGHTS, CANAL ZONE, until 10:00 A.M. EST January 20, 1953 for furnishing all plant, tools, equipment, materials, labor and services, and for performing all work for construction of buildings and appurtenances and alterations to existing building, for Paraiso School at Paraiso, Canal Zone, to be constructed by contract for the Canal Zone Government. Plans and specifications may be obtained from Purchasing Agent, Panama Canal Company, 24 State Street, New York 4, N.Y. Requests should be accompanied by a $30.00 deposit for each set of data. Deposit should be in form of U. S. money order or a certified check made payable to "Treasurer, Panama Canal Company".

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U. S. Engineer's Office
1709 Jackson Street
Omaha 2, Nebraska

Office of the District Engineer
U. S. Engineer's Office
4735 E. Marginal Way
Seattle 4, Washington

Office of the District Engineer
U. S. Engineer's Office
Foot of Prytania Street
New Orleans, Louisiana

Office of the District Engineer
U. S. Engineer's Office
180 New Montgomery Street
San Francisco 19, California

Office of the District Engineer
U. S. Engineer's Office
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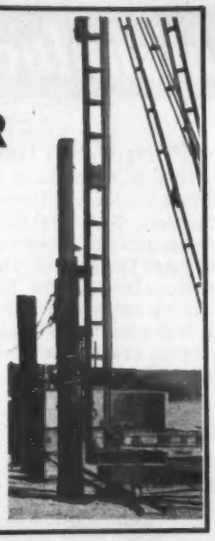

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GIVE TO THE RED CROSS

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Manufacturer Memos

Dewey & Almy President

Hugh S. Ferguson is the newly elected President of Dewey & Almy Chemical Co., Cambridge, Mass., manufacturer of Darex air-entraining agent for concrete. He succeeds Bradley Dewey, who has retired from the office of President which he held since the foundation of the company in 1919. Mr. Dewey is now Chairman of the Board of Directors.

Hugh S. Ferguson

Mr. Ferguson has been with Dewey & Almy for 28 years and was Executive Vice President from 1948 until his present appointment. He has held many positions in the firm, has played a part in the planning, design, and organization of its factories, and has traveled extensively in connection with its foreign operations. He is Vice President of the Massachusetts Institute of Technology Alumni Association.

Huggins for Westinghouse

Wm. F. Huggins, President of Le Roi International and Le Roi Pan-American, has been appointed Assistant to the President, E. O. Boshell, of Westinghouse Air Brake Co., Pittsburgh, Pa. As such, he will perform special assignments directly related to the European companies of Westinghouse. Mr. Huggins will also continue to direct activities of the two subsidiaries of Le Roi engaged in foreign trade.

Westinghouse Air Brake recently acquired a controlling interest in Le Roi Co., Milwaukee, Wis., manufacturer of air compressors, internal-combustion engines, and mining equipment.

Allis-Chalmers Promotions

J. D. Greensward has been named Vice President, Director of Manufacturing for the General Machinery Division of Allis-Chalmers Mfg. Co., Milwaukee, Wis. With A-C since 1922, he was formerly Manager of the company's Apparatus Department and General Manager of the Norwood, Ohio, Works. P. F. Bauer, with the company since 1928, succeeds Mr. Greensward as General Manager of the Norwood Works and Manager of the Apparatus Department.

Robert L. Halsted will take Mr. Bauer's former post as Manager of the A-C central region, with headquarters in Cleveland, Ohio. Succeeding Mr. Halsted as Manager of the Cleveland district office is Joseph Bronaugh, former Manager of the Miami, Fla., office.

Harnischfeger Promotes Losse

Robert O. Losse has been promoted to General Manager of the Escanaba, Mich., truck crane and welder plants of Harnischfeger Corp., Milwaukee, Wis. His service to the company since joining in 1937 has included the posts of General Superintendent of Process Operations, Director of Production and Incentive Standards, and Personnel Manager. Recently he assisted in the setting up of a new P&H factory for the manufacture of small excavators in Dortmund, Germany.

Oberlink Heads NPA Division

Boyd S. Oberlink, Vice President of the Tractor Division, Allis-Chalmers Mfg. Co., Milwaukee, Wis., has been appointed Director of the Construction Machinery Division of the National Production Authority. He succeeds John W. Mohler, who has returned to Caterpillar Tractor Co., Peoria, Ill., with which he has been associated for 19 years. For the past year, Mr. Oberlink served as a consultant to this NPA Division.

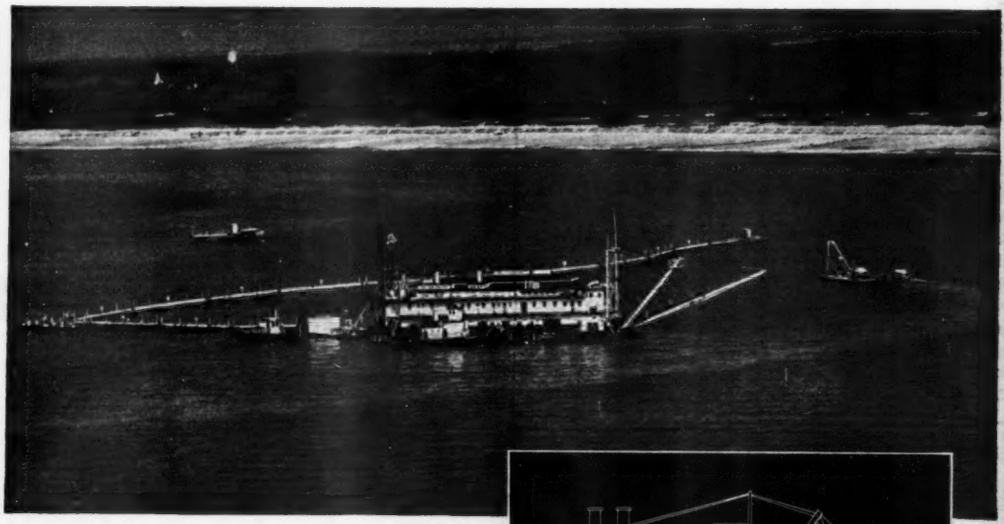
Thew Ups Reynolds, Clark

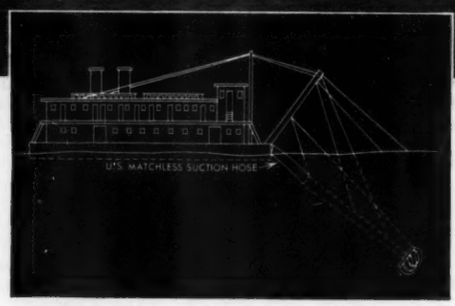
Harry L. Reynolds, former Assistant Secretary-Treasurer and Personnel Relations Director, has been named Treasurer for The Thew Shovel Co., Lorain, Ohio. The new Controller and Secretary of the company is Waid V. Clark, former Controller, Assistant Secretary, and Director. The men have been with Thew for 35 and 8 years, respectively. The appointments were made to fill the posts vacated when R. B. Miller, long-time Secretary-Treasurer of the company, retired last month. Mr. Miller, with Thew for 46 years, retains his Directorship.

American Hoist Appointment

James F. Bishop, in addition to his corporate duties of Secretary-Treasurer, has been appointed General Manager of American Hoist & Derrick Co., St. Paul, Minn. Since joining the company in 1923, he has had wide experience in sales, production, and administration. Mr. Bishop is also a member of the Board of Directors.

What's U. S. Rubber doing to build the world's largest man-made beach?





The dredge which has thus far sucked out over 6 million cubic yards of sand to build the 26-mile long beach from Henderson Point, Miss., to Biloxi, Miss., is equipped with U.S. Matchless® Hose. This tremendous job also includes the pumping of an additional 6 million cubic yards of river silt, sand and mud through this same hose. The sloping bathing beach, when finished, will also provide a defense for the sea wall in abnormally high tides. The "U.S." Hose, acting as a flexible connection between the cutter head and the dredge, is still in good condition and has plenty of service life left, despite its rugged treatment. No matter what your hose problem may be, consult United States Rubber Company.

Photo shows dredge pumping sand to make the artificial beach on the Mississippi shore. It extends approximately 1500 feet into the stream. The diagram shows the cutter head which stirs up sand and silt. This in turn is drawn through the pipe, then through the U.S. Matchless Suction Hose to the pump and through the discharge line.

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Top producer FOR CENCI

THIS husky, high-speed, high-capacity "Caterpillar" DW21 Tractor with No. 21 Scraper really delivers for Nick Cenci and Sons, Inc., Columbus, Ohio. D. F. Cenci, Vice President, says: "I bought this new rig because I knew from experience that 'Cat' machines get top production day in and day out with a minimum of down-time. But the DW21 has proved even better than I expected. The engine has lots of guts. The scraper has lots of capacity. The tractor is really maneuverable. And that's what it takes to keep dirt moving on schedule."

Working 10 hours a day on a 550,000-yard relocation of U.S. Highway No. 50 near Guysville, Ohio, this big yellow rig averaged 12 trips per hour on a half-mile haul. With a D8 as a pusher, it took only one minute to load. And it unloaded on the run in 16 seconds. Average load — 17 cu. yds.

Big production is engineered into "Cat" DW21s. Here are a few of their many features:

1. *Every inch is designed and built by one manufacturer — "Caterpillar".*

2. *Horsepower (225 at the flywheel) and capacity (20 yards, heaped — 15 yards, struck) are* balanced *for fast loading and hauling.*

3. *Constant mesh transmission makes shifting easy, fast, smooth.*

4. *Large, strong clutch prevents slippage — saves strain on operator.*

5. *Rugged, safe triangular hitch gives wider bearing space and 4-point load distribution.*

6. *Cable operation of No. 21 Scraper permits effective pumping of dead material.*

7. *Positive ejection dumps any material on the move quickly, easily.*

Out on jobs that separate the men from the boys, "Caterpillar" DW21s are coming through with top performance. Get the *facts* about them from your nearby "Caterpillar" Dealer!

CATERPILLAR

REG. U. S. PAT. OFF.

DIESEL ENGINES
TRACTORS • MOTOR GRADERS
EARTHMOVING EQUIPMENT

CATERPILLAR, PEORIA, ILLINOIS

How operator gets *TOURNAROCKER* out of a hole . . .

Variable wheelbase, front-wheel drive, electric controls pay off on New Hampshire job

Visitors to a highway grading job near Lake Sunapee in New Hampshire were treated to an unusual demonstration of hauler traction and mobility recently. A fast 18-ton rear-dump Tournarocker owned by Frank J. Whitcomb Construction Corporation, North Walpole, N. H., was taking a load of boulders and dirt to a roadside fill. Backing up to dump, the operator mistook some very soft footing for solid ground. Just as the load started to fall, the ground gave way. The 'Rocker's rear wheel slipped into a hole 3½ to 4 feet deep. Editors of *Contractors and Engineers Monthly* magazine, who happened to witness the incident, commented: "A rear-drive vehicle would have been stuck, but good, and would have required assistance to get out of the hole. Not so the Tournarocker."

Changing wheelbase does trick

Without batting an eyelash, the operator continued to dump the load with Tournarocker's rear wheels still braked and still in the hole. After dumping, operator pulled the bowl down to its horizontal haul position. This pushed unbraked front wheels forward and lengthened Tournarocker's wheelbase by 6½′ (from short 9½′ dumping span to full 16′ travel position). Operator then flicked his power steer button, swinging 2-wheel electric control prime-mover around 90°. With front wheels anchored in this right-angle position for maximum holding power, he locked front-wheel brakes and released the rear wheels.

Lifts rig out by its "boot straps"

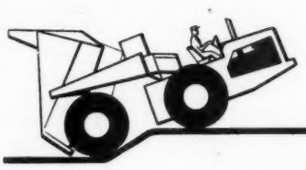
Next, operator touched rig's fingertip switch operating "dump" motor. As dump cable shortened, it hoisted empty bowl, drawing free-wheeling trailing unit forward. Wheelbase was shortened, and body wheels pulled up and out of ditch to firm ground. As C&EM editors put it, "The rear wheels lifted right out of the hole, and in a jiffy the Tournarocker had spun around and was on its way back to the shovel for another load."

Get facts for your work

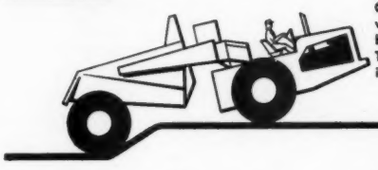
Incidents like this only illustrate Tournarocker's unusual maneuverability and traction . . . advantages that pay off for earthmovers everywhere. Other features, like positive-power steer, power-proportioning differential, fingertip electric controls also help deliver *more pay yards per hour at lowest net cost.* Whether you've got rock, ore, or scraper dirt to move, your best bet is to get full facts from your LeTourneau Distributor. He'll help you estimate production and operating costs without obligation.

R. G. LeTOURNEAU, INC., *Peoria, Illinois*

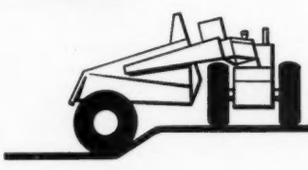
Photos courtesy Contractors and Engineers Monthly



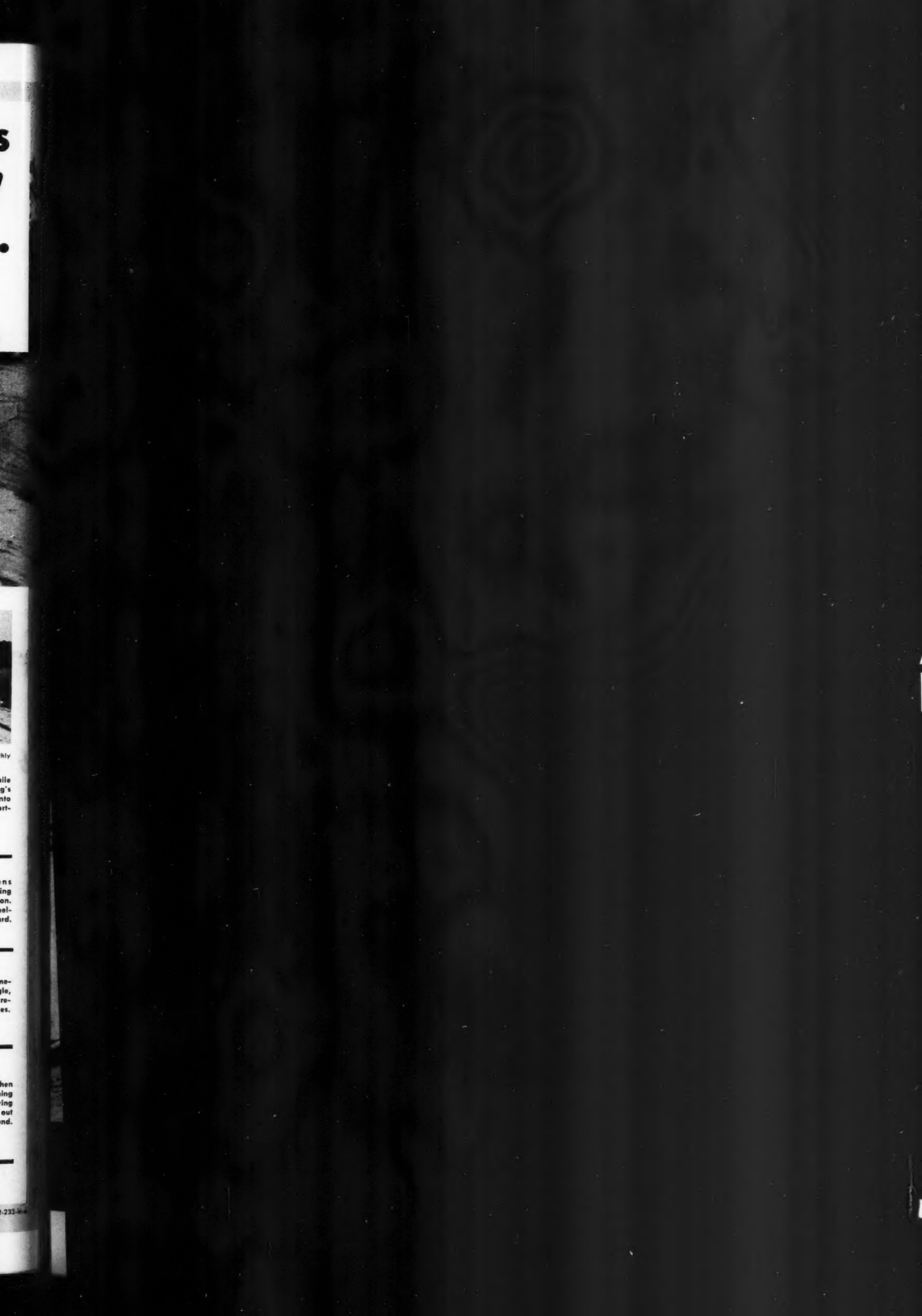
Soft fill gives way while dumping, dropping rig's braked rear wheels into 3½′ hole. Note shortened wheelbase.



Operator lengthens wheelbase by returning bowl to haul position. This pushes free-wheeling front end forward.



Next, he turns prime-mover at right angle, sets front brakes, releases rear-wheel brakes.

Electric dump motor then raises bowl, shortening wheelbase and drawing rear wheels up and out of hole to solid ground.

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